

**COMBAT RATION NETWORK
FOR
TECHNOLOGY IMPLEMENTATION**

Multiple-Unit MRE Leak Detector

Final Technical Report STP 1005

Results and Accomplishments (Feb. 1997 – Sept. 1998)

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Fort Belvoir, VA 22060-6221

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FLEXIBILITY

INTEGRATION

DATA BASE

SHOP FLOOR

HEAD SPACE

WEAK SEALS

SEAL

LEAKS

36.1 Objective

TO DEVELOP AND DEMONSTRATE A MACHINE THAT WILL INSPECT MULTIPLE UNITS OF MRE POUCHES FOR WEAK SEALS AND LEAKS IN THE AREA OF THE SEALS, ON LINE, AT LINE SPEEDS, WITH AN EFFICIENCY BETTER THAN HUMAN INSPECTORS.

37.1 Approach

BASED ON THE WORK OF A PREVIOUSLY COMPLETED BENCH TOP PROTOTYPE, THE TASK WAS TO SCALE UP TO HANDLE MULTIPLE POUCHES. THIS BECAME A PROBLEM OF MATERIAL HANDLING, SINCE THE ACTUAL INSPECTION TECHNIQUE, BASED ON DEFLECTION OF THE SURFACE OF THE POUCH UNDER A VACUUM, DOESN'T CHANGE. A PRIVATE SECTOR MANUFACTURER SKILLED IN MATERIAL HANDLING EQUIPMENT, WORKED WITH THE MANUFACTURER OF THE VACUUM LEAK DETECTOR EQUIPMENT, TO DEVELOP THE PROTOTYPE THAT WAS TO BE DELIVERED IN DECEMBER 1997.

38.1 Progress

THE PROTOTYPE EQUIPMENT HAS BEEN ACCEPTED AT THREE MRE PRODUCER PLANTS, AND IS IN VARYING STAGES OF IMPLEMENTATION, CALIBRATION FOR PARTICULAR PRODUCTS, AND TRAINING OF OPERATORS.

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13. ABSTRACT (Maximum 200 words)

This activity was to perform a Short Term Project under the CORANET PARTNERSHIP, SPO 103-96-D-0016. The overall objective of this project is to assist the MRE producers in their identification and acquisition of leak detection systems that can be used in the MRE production process. To accomplish this objective, several sub objectives have been established which will identify the location within the production facility where leaky pouches can best be detected, the multiple unit testing configuration, materials handling and data collection, and cost/benefits. This STP uses the baseline leak detection system, ATC-3, and determine the impact of such variables as pouch temperature and cartoning. This work will form the basis for assisting the MRE producers in selecting systems for in-line plant use and startup of that equipment.

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1.0 Introduction

This activity was to perform a Short Term Project under the CORANET PARTNERSHIP, SPO 103-96-D-0016. The overall objective of this project is to assist the MRE producers in their identification and acquisition of leak detection systems that can be used in the MRE production process. To accomplish this objective, several sub objectives have been established which will identify the location within the production facility where leaky pouches can best be detected, the multiple unit testing configuration, materials handling and data collection, and cost/benefits. This STP uses the baseline leak detection system, ATC-3, and determine the impact of such variables as pouch temperature and cartoning. This work will form the basis for assisting the MRE producers in selecting systems for in-line plant use and startup of that equipment.

The objectives of this Short Term project are: (1) scale-up the existing single-unit baseline Leak Detector (ATC-3) to a multiple test unit enabling effective, in-plant inspection, and (2) to provide guidance, assistance and consultation to industry to help producers integrate production leak detectors into their processing lines. In the process of engineering and demonstration, the first system is installed at the CORANET Demonstration site to gain experience, demonstrate the technology and provide training in concert with the new equipment deployment at the MRE producer facilities.

2.0 Background

There is currently a requirement for two 100% inspections, pre- and post retorting in each plant producing retorted MRE pouches, looking for cuts, holes, surface defects and seal leaks. In spite of this significant investment in manpower for the inspection tasks, the final rate of rejection of lots is too high (often 12 to 15 percent of which 4 to 7 percent is due to pouch abrasions and holes). Evidently the human inspection system is not as effective as it needs to be, allowing an excessive number of defects in the finished product lots, and lowering the probability of lot acceptance to an undesirable level. To increase the probability of lot acceptance, the defect ratio in the finished product lot has to be decreased. This can be accomplished by either decreasing the number of defects created by the process or by increasing the efficiency of the inspection system.

For example, if the process produces 10 defects per 10,000 pouches and the inspection system has an efficiency of 50%, then the finished product lot will contain 5 defects per 10,000 pouches, and based on a 200 pouch sample size, this lot will have a 90% probability of being accepted. If the inspection efficiency can be increased to 80%, then the defect ratio in the finished product will be reduced to 2 per 10,000 pouches and, under the same sampling rule, the probability of lot acceptance will increase to 96%. The results of STP #75, "Leak Detector Implementation" indicate that the human inspection accuracy is approximately 50% and the ATC-3 detector is capable of attaining 80-100% accuracy.

During STP #21 "Non-Destructive Prototype to Inspect MRE Pouch Seal Integrity", known commercially available leak detectors were found unacceptable for MRE Pouch application. In general, the detectors were designed for rigid containers and when used for flexible pouch gave results not much better than a coin-toss. Developments in STP #21 and STP #75 resulted in extensive modification of two detectors increasing their accuracy (with MREs) from 10 - 40% TO 50 - 80%. Depending on the pouch leak location, size, product, etc., the latter detector (the ATC-3) is capable of up to 100 accuracy.

3.0 Activities

3.1 Phase I - Preliminary Engineering

3.1.1 Review with MRE Producers

The MRE producers were briefed at CORANET Workshop #6, 24 February 1997 on various aspects of this project:

- Leak Detection technologies; techniques, characteristics, advantages/disadvantages
- Equipment Suppliers
- Benchmark Results with ATC-3 Benchtop Unit - from earlier project
- Concepts for On-Line Leak Testing - preliminary designs
- Experimental Data from modified ATC-3 Tester
- Preliminary Cost Estimate for On-Line Unit
- Additional Benefit - Residual Gas Testing

Further involvement with the MRE producers included an information package distributed 21 March, 1997 which included a description of the concept design, a sketch and questionnaire. The questionnaire sought to address issues regarding system integration:

- Cartoner production rate
- Cartoner discharge - height, width, conveyor description
- Package sizes
- Space limitations for equipment
- Leak Test Discharge requirements

Replies were received from the Producers and their input was included in the final equipment specification.

3.1.2 Preliminary Engineering

A number of technical issues needed resolution in order to verify the feasibility of on-line leak detection. These issues included:

- Reduce test cycle time - benchmark tests were performed in 40 - 60 sec. per pouch
- Test larger quantity and variety of MREs - only 17 pouches used in benchmark test
- Determine test methodology - identify sensor types and vacuum requirements

- Determine optimum location within production process for on-line leak detection
- Evaluate package handling issues - package transport, accumulation, reject
- Identify environmental issues - pouch temperature range, headspace range
- Identify system control issues - operator interface, controllers, operational procedures
- Design requirements - safety features, utilities, materials, water resistance

The ATC-3 bench unit served as the test bed for experimentation, modification and method development. Also, an ITI-Qualitek Model 171 unit was leased near the conclusion of this activity to validate aspects of the test method.

3.1.3 Specifications

Specifications and design concept drawings were made on the basis of the preliminary engineering as well as input from the MRE producers. The specifications for Leak Tester For MRE Production Line, found in Appendix 6.4, are the basis for building the prototype Multi-Unit Leak Detection System. The specification included the following sections:

1. Functional Description
2. Performance Requirements
3. Package Information
4. Design Requirements
5. General Information
6. Acceptance Requirements
7. Shipping and Installation Requirements

The specification is the basis for equipment contractor bids and the primary contractual document between Rutgers University and the winning equipment contractor.

3.1.4 Economic Analysis

A traditional breakeven evaluation of the system cost benefit consisted of estimating equipment cost for copies of the prototype machine and the cost reducing benefit of lower number of defective packaging (and rejected lots) and reduced inspection. A further cost benefit, but not evaluated here, is a large potential reduction of labor for the manual human inspection system that may be realized at some time in the future, should it be shown that the effectiveness of automated leak detection inspection exceeds that of the manual one.

The cost of a production MRE on-line leak testing machine is estimated:

Control Panel	\$ 10k
Materials Handling/Chamber	\$ 50 - 75k
Vacuum System	\$ 10k
Integration/Installation	\$ 10k
Detection System (12@S2k)	<u>\$ 25k</u>
Total	\$125 - 150k

The cost for reworking defective pouches was not available, the MRE producers for competitive reasons were not willing to share their data. Costs for leak defects can be classified into several categories:

1. On-line inspection
2. Rejected lot at producer
3. Rejected lot at assembler
4. Meals "on-hold"
5. Meals discarded in the field

A breakeven point of \$37k savings per year was calculated. The breakeven assumes an investment of \$150k, amortized over 5 years. Therefore, the combined savings from; reduced defective lots, reduced labor, value of realtime information (plant personnel knowing when production problems exist) and long term information (effectiveness of the inspection system) should exceed \$37K per year. It is reasonable to assume that breakeven will be achieved based on 1994-95 USDA inspection data for which the industry produced 87 MRE lots rejected for holes (not including lots rejected for headspace or open seals).

3.1.5 Proposal Preparation and Award

A Request for Proposal was issued by Rutgers University Procurement and Contracting on April 4, 1997 to seven companies:

Nikka Densok U.S.A., Inc.
 Packaging Technologies & Inspection*
 ITI-Qualitek*
 Modern Controls, Inc.
 Precision Automation Co., Inc.*
 Rame-Hart, Inc.*
 Applied Technology Concepts, Inc.

*Submitted proposals

Selection criteria was established prior to release of the RFP:

Delivery	5%
Performance	30%
Engineering Features	30%
Cost	20%
Service	10%
Training	5%

The results of the Proposal Evaluation are summarized in Appendix 6.5. The Precision Automation proposal was awarded 84 out of possible 100 points, highest of all proposals and was selected for contract award. The vendor proposals are included as Appendix 6.6.

3.1.6 Phase I In-Process Review

The In-Process Review culminates the Phase I activities for benefit of all CORANET members. The Review was held on May 7, 1997 at the CORANET Demonstration Site at Rutgers University Food Manufacturing Technology Facility. The Review covers all relevant work including a demonstration of leak tester technology on

lease from ITI-Qualitek. The final result of the In-Process Review was an approval by the military Program Manager to proceed with Phase II and III of the project.

The In-Process Review was an educational experience for military as well as MRE Producer personnel as leak test technology is a new development to this packaging field. The presentation overheads are found in Appendix 6.7.

3.2 Phase II - Production Prototype

3.2.1 Production MULD

The following chronology details events of the construction and installation of the MULD:

Jun '97	Rutgers completes subcontract documents
Jul '97	Military adds task to STP for residual gas testing Precision Automation executes subcontract
Aug '97	Rutgers issues P.O.
25 Aug '97	Kick Off meeting at Precision Automation
Sep '97	Prototype Chamber* engineering started
Nov '97	Prototype Chamber* fabrication, begin leak tester programming
6 Feb '98	Prototype Chamber* test at Precision Automation, Cust. Approval
Feb '98	Mechanical Detail Engineering started
Mar '98	Controls Detail Engineering started, Bill of Materials release
Apr '98	Parts fabrication and begin assembly
Jun '98	Equipment testing and debug
Jul '98	Assembly complete, factory test and customer acceptance Installation at Rutgers U. FMTF
24 July '98	Multi-Unit Leak Detector Demonstration for CORANET

* The Prototype Chamber was fabricated as an intermediate development step to assess chamber design and fine-tune the evacuation system. The chamber included one functioning force sensor and controls, capable of leak testing an MRE pouch. The components of the Prototype Chamber were later used in the final MULD assembly.

3.2.2 Performance Testing

Leak test performance tests were conducted at the Prototype Chamber test, Factory Acceptance Test and Final Equipment Acceptance/Demonstration. The tests were conducted on MRE pouches produced on the Rutgers U. FMTF Tiromat Horizontal Form-Fill-Seal packaging line. The tests were conducted primarily with pouches containing Ham Slice with an average headspace of 8cc residual air. Other products tested included; Frankfurters and Beef Stew.

3.3 Phase III - Engineering Support & Training

3.3.1 Engineering Support

Support was provided to Defense Support Center Philadelphia (DSCP) in the acquisition of MULD production equipment. This activity included equipment specifications, background information, contact information and providing additional technical information to support contracting. DSCP personnel attended the prototype MULD concept acceptance test at Precision Automation and the final equipment demonstration held at Rutgers University Food Manufacture Technology Facility.

3.3.2 Training

A Training Workshop for the MRE producers was not possible within the remaining schedule of this project. It was agreed with the Military Program Manager that it would be appropriate for this activity to be included in a future Short Term Project at a time that coincided with deployment of MULD equipment at the producer facilities.

3.3.3 Final Report

Preparation of this report is the final task and deliverable for STP #1005.

4.0 Technical Discussion

4.1 ITI-Qualitek 711 Benchtop Unit Installation

4.1.1 Location: Install the instrument on a level, horizontal surface in an area free from vibration and no more than 8 feet from an electrical outlet.

4.1.2 Power Supply: AC supply 90V – 260V, 50Hz – 60Hz.

4.1.3 Operating Conditions: Temperature - 32°F to 104°F. Humidity 0% – 90%. *Unit should be allowed to come to ambient temperature before use.








4.1.4 Vacuum source: The Q711 should be connected to the plant vacuum system or Busch 400 Multivac vacuum pump. Small vacuum pumps yield unacceptable evacuation times.

4.1.5 Vacuum Supply Connection: The Q711 accepts 5/8 " reinforced tubing. The line from the Busch 400 to the Q711 should be 1" diameter line with a reducer and short run of 5/8" tubing. The object being to maintain maximum air flow to the Q711.

4.1.6 Infill: The infill supplied with the Q711 should be machined to accept the largest 8oz MRE carton, (appx. 3/4" deep). For the smaller 4.5oz – 5 oz MRE cartons (appx. 5/8" thick), a piece of pourous material 1/8" thick can be used to bring the small carton height up to the level of the large carton.

4.1.7 Pressure-plate Setting: Having milled the infill, the pressure plate can be set using the top of the infill as the datum point. To adjust the pressure plate:

1. Ensure that the vacuum level has been set.
2. Ensure that the pressure plate is raised to clear of any pack or infill.
3. Fit the required infill (if any) into the test chamber.

4. Install a known defective pack - one that will not expand under vacuum.
5. Set the access key to the  position to enter **Program** mode.
6. Press  until you reach Set Up, then  to enter **Set Up** mode.
7. Press  until you reach **Adjust** function.
8. Close the lid and press . The test chamber will then start to evacuate.
9. When the vacuum level has been achieved the unit will go into **Stab** phase, and a level will be displayed of 0 ± 30 counts. Note this reading.
10. Continue to observe the display, and slowly turn the adjusting wheel clockwise. At some point the display reading will begin to rise: this shows the pressure plate is bearing down on the pack or infill. Slowly turn the adjusting wheel counter-clockwise until the reading returns to the original, and then continue to turn the adjusting wheel a further 1/4 turn.
11. Hold the adjusting wheel firmly and then turn the locking wheel clockwise.
12. Press the  button: the display will return to **Adjust**.
13. Turn the access key to the  position. The display will now show **Ready**.

4.1.8 Data Collection Options: The Q711 has a RS232 data port on the back of the unit. The data stream from the Q711 is a carriage return delimited ASCII file. ITI-Qualitek offers two options; a serial port **printer** or an **SPC software** package for PC. A third option is to capture the data on a PC by running HyperTerminal communication software included with Windows 95, see accompanying box for set-up details. The data can be printed or saved to disk. Note: a special serial cable must be fabricated. see ITI-Qualitek manual for connector wiring diagram.

4.2 MULD Installation and Integration

The following guidelines are recommended for installation:

- 1) User Responsibilities:
 - a) Refer to machine documentation "General Operating Instructions" Section 2.0, Specifications.
 - b) Locate machine in manufacturing area.
 - c) Provide power supply within 8 ft. of control panel.
 - d) Provide air supply within 8 ft. of the machine filter regulator.
- 2) Precision Automation Co. Responsibilities:
 - a) Supervise connection of power supply to control panel.
 - b) Supervise connection of air supply to the machine.
 - c) Supervise connection of upstream and downstream interlocks.

- d) Verify and adjust the machine location for conveyor upstream and downstream conveyor alignments.
 - e) Power up the machine and verify all connections and alignments.
 - f) Perform machine calibration (vacuum, force).
 - g) Perform adjust force procedure for height of MRE pouch.
 - h) Test run with customer furnished product (same product furnished at factory acceptance test or other product pre-tested by Precision Automation).
 - i) Operator training per the Start Up/Test Procedure.
- 3) User and Precision Automation Co. Responsibilities:
- a) Plant acceptance test per the Start Up/Test Procedure.

4.3 MULD Documentation and Training

An equipment manual was produced by Precision Automation covering operation and maintenance procedures:

- 1) General Operating Instructions
- 2) Leak Detection System Acquisition Software Users Guide
- 3) PLC Program Listing
- 4) Mechanical Drawings
- 5) Electrical Drawings
- 6) MULD Operator Training

Additional documentation was developed by Rutgers to further assist operators covering specific procedures for MRE pouches; MULD Operation Procedure (Appendix 6.8) and MULD Recipe Development (Appendix 6.9). These guides are useful for training plant personnel that regularly operate MULD equipment.

4.4 MULD Demonstration and Acceptance Test

Acceptance testing was conducted at Precision Automation during testing and at Rutgers U. FMTF following plant installation. A MULD demonstration was held on 24 July 1998 attended by personnel from DLA, DSCP, Nattick, ACES, FDA, Wornick Co., SOPAKCO, Ameriquel Foods, Texas A&M University, ITI-Qualitek and Precision Automation. An agenda and presentation is included as Appendix 6.10. The MULD was demonstrated for approximately 20 minutes, running at 100 MRE packages per minute. Defects were created by puncturing pouches with various sized probes and inserted randomly (mixed with "good pouches") into the production line. The defects were correctly identified in 100% of the cases without a single "good pouch" falsely rejected. Approximately 100 defective pouches were tested, or 5% of the total number in the demonstration. The MULD Demonstration verified that all performance specifications were met.

5.0 Recommendations

The MULD and benchtop leak test units have been demonstrated to be an effective in-process control for the detection of leaks and excessive residual gas defects in sealed, retorted packages. Implementation of MULD systems in the military rations

manufacturing plants would significantly reduce the number of defective packages that are sold to the government. A significant cost savings from the lower defect rate will result in a reduced ration cost. This technology can benefit a number of other packaged products; fresh meats, snacks and shelfstable products.

6.0 Appendix

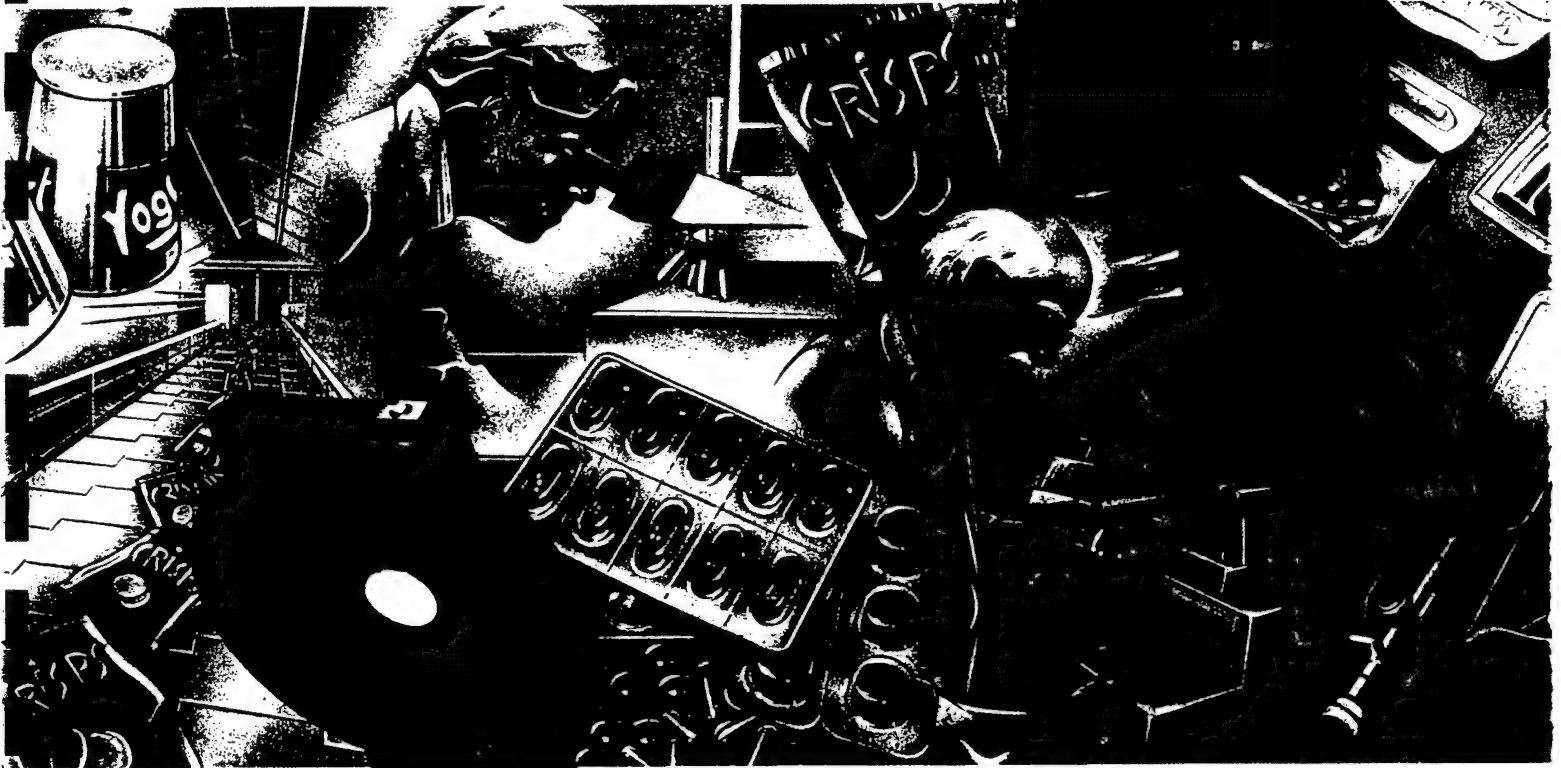
- 6.1 Project Management Plan and Schedule**
- 6.2 ITI-Qualitek 711 Leak Test System Description**
- 6.3 ITI-Qualitek 711 Set Up Procedure**
- 6.4 Specification for Leak Tester For MRE Production Line (MULD)**
- 6.5 MULD Bid Evaluation**
- 6.6 Vendor Proposals for MULD**
 - 6.6.1 Precision Automation Proposal**
 - 6.6.2 Rame-Hart, Inc. Proposal**
 - 6.6.3 ITI-Qualitek Proposal**
 - 6.6.4 Packaging Technology & Inspection Proposal**
- 6.7 MULD Phase I - In-Process Review, 7 May 1997**
- 6.8 MULD Operation Procedure**
- 6.9 MULD Recipe Development**
- 6.10 Multi-Unit Leak Detector Demonstration, 24 July 1998**

Appendix 6.2

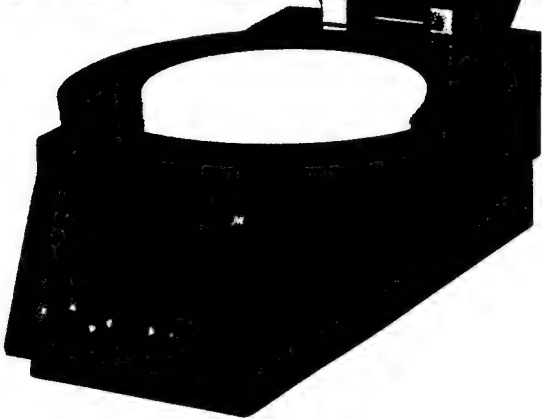
ITI-Qualitek 711 Leak Test System Description

**ITI
QUALITEK**

Qualipak Systems



**Non destructive leak
testing of packaging
for Foods,
Pharmaceuticals and
Medical Devices**



**M MEGGITT
CONTROLS**

QUALIPAK TESTING ASSU

Protection of the product is the principal requirement of packaging, and is particularly important in the Food, Pharmaceuticals and Medical Product industries.

Qualipak systems are designed to test flexible and blister packs for any weakness or flaw in the seals and materials which may result in contamination or deterioration of the product.

Not only is product quality improved but Qualipak testing provides operational and significant cost benefits by:

- Non destructive leak testing of the product
- Clean and simple operation
- Objective and quantifiable measurements
- Compliance with GMP

Qualipak Systems in Operation

The increasingly stringent demands on packaging to protect for longer time periods has required the development of better testing methods to remove subjective judgements.

Well proven leak detection technology is used to monitor package quality rapidly and reliably with the facility to generate valuable data for trend and potential risk analysis.

For Food

in maintaining hygiene and safety standards, reducing contamination risks and improving quality. Testing snacks, convenience foods, coffee, soups and many more with the Qualipak 171.

For Pharmaceuticals

to minimise the risk of pack penetration and possible contamination by bacteria, air and water. Testing medical preparations, drugs, tablets and pills with the Qualipak 170 and 171.

Testing On-line or in the Laboratory

Qualipak systems are designed for both production and laboratory use, whether for dedicated or multi-line testing.

Easily integrated into current QA strategies, Qualipak systems are designed for operation by non-specialist personnel. They feature, control software, test parameters and data that are protected in accordance with the latest QA procedures to ensure integrity of the results.

Meets GMP Requirements

Qualipak systems are designed to assist users in complying with Good Manufacturing Practices. The testing parameters and result information can be output to a printer or compatible data acquisition system to provide complete traceability. Each test record can be provided with product, line and batch identification, which is time and date stamped with provision for the operator's signature.

A bi-directional RS232 interface port is provided for remote control and down-loading to a central computer.

All Qualipak products are validated to the ISO9001 quality standard and their performance may be routinely checked with calibrated leaks.



TEST PARAMETERS		
PARAMETER	UNITS	VALUE
Pre Vac Time	Seconds	
Test Vac Time	Seconds	
Evac Time	Seconds	
Evac Torque	Seconds	
Strap Time	Seconds	
Gross Limit	Strain	130
Decay Limit	d Strain	
Test Time	Seconds	

▲ Qualipak 171 data



For Medical Devices

to maintain absolute cleanliness and prevent the spread of infection. Testing diagnostic kits, I/V devices and sterile packed instruments with the Qualipak 171.

ING PACKAGING QUALITY

Qualipak 171 for Flexible Packaging

The Qualipak 171 is a self contained, easily transportable test station, equally applicable to low volume production and multi line manufacturing installations.

It features

- High sensitivity, detecting holes down to 12.5μ holes
- New sensor, no moving parts for greater reliability
- Validation of performance option
- Simple program set up and storage

Setting New Standards

The new strain gauge transducer gives extreme sensitivity and excellent resolution for precise and repeatable measurements to be made.

This allows widely different pack sizes and volumes to be tested with unrivalled flexibility in a easily accessible test chamber. The accurate reliable performance emanates from the simple durable design which



fully complies with IP55, safety and EMC standards.

Easy to Use

Operation could not be simpler. After setting up the programme test parameters via the membrane keypad and alphanumeric display, the pack is loaded, the lid closed and the test sequence initiated by the press of a button. On completion a green pass or red reject light is activated and the result detail and testing statistics are displayed for rapid reference. For operator convenience, up to 16 programs can be stored in memory.

Qualipak 171 test results

RESULT

CURRENT TEST RESULTS

DATE	12.11.1995
TIME	14.30
PROGRAM	PROG 1
TEST	2.00
NO	A1
NUMBER	197
AT START OF TEST	1.35
END OF TEST	1.04

STATISTICS

NUMBER OF PASSES	195
NUMBER OF REJECTS	2
TOTAL TESTS	197

Qualipak 170 for Blister and MAP Packs

The Qualipak 170 has been developed for the pharmaceutical industry and systems are supplied to user specification. Key features are

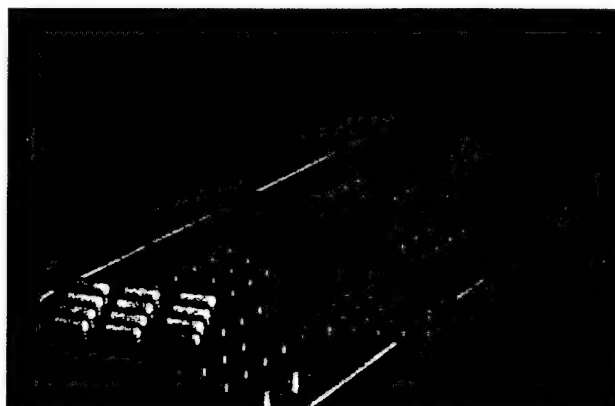
- Detection of $< 25\mu$ holes
- Computer control and data handling
- Easily interpreted display of results
- High reproducibility

Pinpoints faulty pockets

The patented Capacitance Array detector enables the location of leaks on the packs to be detected and pictorially displayed on the computer. Results are recorded on the integral database for interrogation and analysis to detect trends and potential problems.

Rapid set up and test procedure

The test parameters, display details and report requirements are entered into the system using



a standard keyboard and can be stored and security protected for future use. The test cycle is completed in typically 10 seconds with an immediate display of the results.

Handles different pack formats

The customised test jigs are quickly interchangeable to allow packs of different size and configuration to be evaluated.

Systems and Special Engineering

Some packaging shapes, sizes and test requirements may be outside the capacity of the standard Qualipak 170 and 171 specifications

Where this is the case a custom engineering service is available with a technical team to advise the user and develop a system for the application. Such special needs vary from the ability to handle extra large packs through to the supply of a completely automatic turnkey test station. The vast experience of the Company in the testing techniques, the instrumentation and from many installations ensures the development of efficient and cost effective solutions.



▲ Qualipak 171 with accessories

The company is an accredited ISO9001 firm of assured quality and has a world-wide reputation for expertise in designing, manufacturing and supplying leak detection systems to a broad range of industrial and scientific organisations. Their prime applications are in quality assurance, where the product integrity is monitored and reported against rigorously defined standards.

The company offers a dynamic blend of scientific and engineering expertise, with a first rate after sales service and support. As a member of the Controls division of the multinational Meggitt group, the Company offers a dynamic blend of scientific and engineering expertise, with a first rate after sales service and support.



Authorised Distributor



Specifications

Qualipak 171

Sensitivity	<12.5µ hole size
Test capacity	Packs up to 10 x 21 x 27 cm (4 x 8.3 x 10.5 ins)
Number of programs	16 user definable
Display	20 character alpha numeric
Indicators	Green pass and Red fail lamps
Supplies and services	120/240 V, 50/60 Hz External vacuum source
Accessories	Custom made infills Printer kit Remote Start/Reset, Pass/ Fail, and Program selection unit Calibrated orifice validator unit Vacuum pump kit

Qualipak 170

Sensitivity	<25µ hole size
Test capacity	Up to 8 packs
Number of programs	Unlimited, user definable
Supplies and services	120/240 V, 50/60 Hz Compressed air
PC controller	Supplied to customer requirements

Due to continual development the manufacturer reserves the right to change the specification without notice.

For Sales and Service information in the Americas

ITI QUALITEK

340 Fordham Road, Wilmington, MA 01887, USA
Tel: (508) 658-3767 Fax: (508) 657-5954

Head Office

Ai CAMBRIDGE LTD

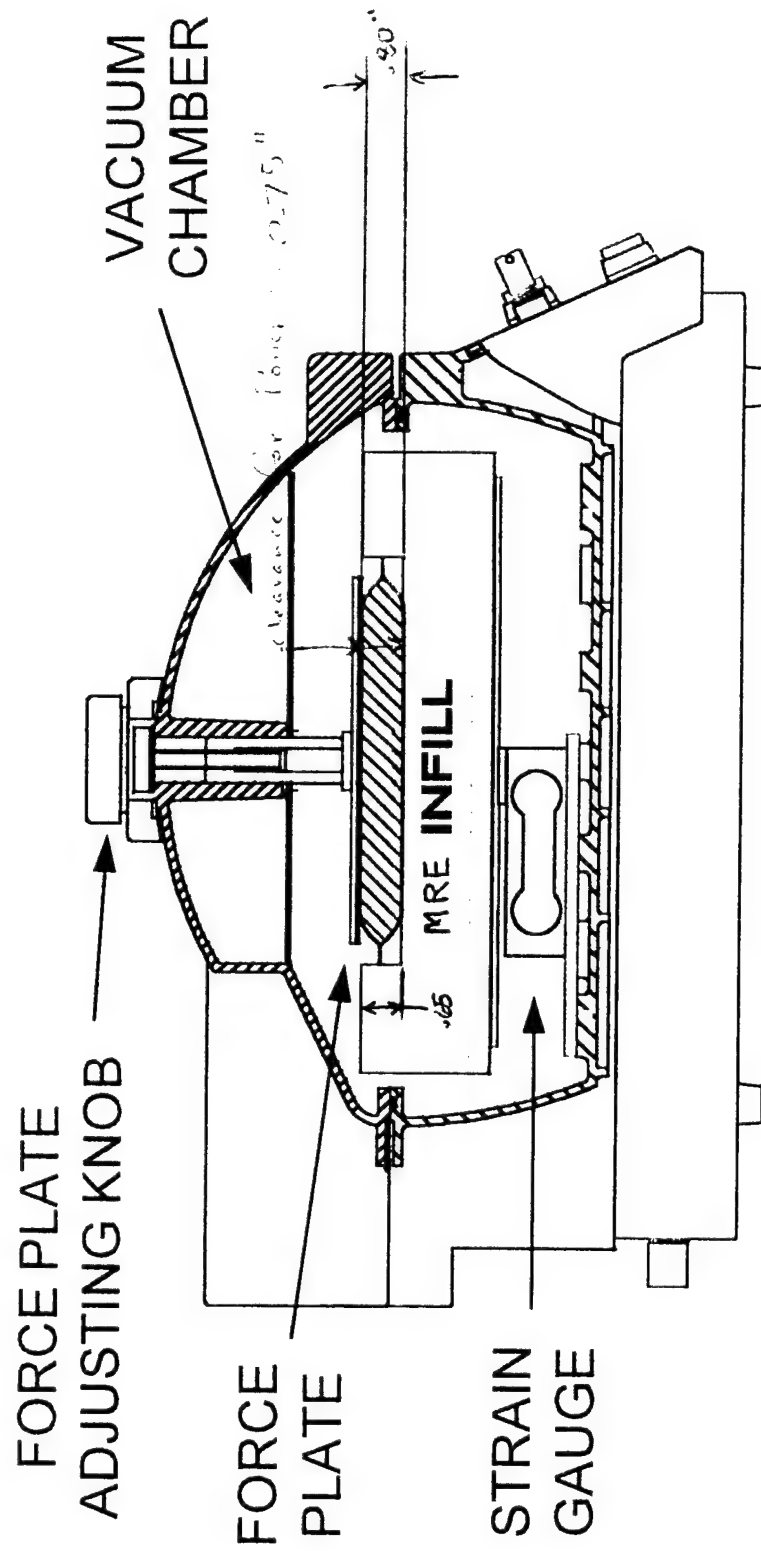
Ai Cambridge Ltd, London Road,
Pampisford, Cambridge England CB2 4EF
Tel: (INT 44) (0) 1223 834420
Fax: (INT 44) (0) 1223 835050

For Sales and Service information in Germany

MELTRON MESSTECHNIK GMBH

Postfach 1248, 41336 Korschenbroich
Tel: 02161/64511 Fax: 02161/642909

QUALIPAK 171 Cross Section



QUALI PAK
LEAK DETECTION

ITI QUALITEK 267 Boston Road N. Billerica, MA 01862 (508) 670-1113

QUOTATION

PAGE 1 OF 1

151 BOSTON ROAD
N. BILLERICA, MA 01862-2310, USATEL 508-670-1113
FAX 508-670-1114TO: Mr. Neal Litman
Center for Advanced Food Technology
120 New England Avenue
Piscataway, NJ 08854REFER TO THIS
NUMBER ON ALL
CORRESPONDENCE **ITI- 6081**YOUR REFERENCE NO
VerbalDATE QUOTED
May 29, 1997☒ F.O.B. N. BILLERICA, MA☐ F.O.B.

TERMS:

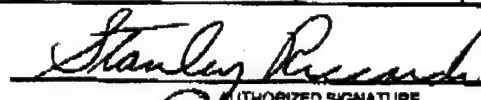
☒ NET 30 DAYS☐ CONFIRMED IRREVOCABLE
LETTER OF CREDIT☐ PREPAYMENT☐ C.O.D.☒ Subject to
Credit Approval

VALID FOR 90 DAYS ONLY

DIRECT ANY QUESTIONS CONCERNING THIS QUOTATION TO:
David Morris - President

ITEM	QUANTITY	CAT. OR PART NO.	DESCRIPTION	UNIT PRICE	TOTAL
1	1	100-171	ITI Model 171 Qualipak Microprocessor Controlled	\$11,550	\$11,550
2	1		Special Larger Vacuum Port, & Valves for quicker evacuation, additional cost per unit.	\$ 1,400	\$ 1,400
			TOTAL		\$12,950
			ENGINEERING (One Time Charge)		
			1. Hardware design change (Larger vacuum port & valves).		\$ 3,500
			2. Software change (Max gross level, gross at end of stabilization).		\$ 700
			SPECIFICATION: As indicated on the enclosed brochures.		
			FREIGHT & INSURANCE CHARGES:	As Applicable	
			DELIVERY: Eight to Ten (8-10 weeks) after receipt and acceptance of order at ITI subject to material availability		
			LIMITED WARRANTY PERIOD: 12 months refer to reverse side of this quotation for further details.		
			NOTE: Rental Fee of \$1,732.50 will be Credited to the purchase price of the Instrument.		
				Total Less credit	15417.50

THIS QUOTATION IS SUBJECT TO THE TERMS AND CONDITIONS ON THE FACE AND REVERSE SIDE HEREOF.



 (AUTHORIZED REPRESENTATIVE)









Appendix 6.3

ITI-Qualitek 711 Set Up Procedure

ITI-Qualitek Set Up Procedure

Before beginning the process of developing a test protocol or "*recipe*" make sure the MRE carton being evaluated fits into the infill so the top of the carton is level with the top of the infill. **Do not** adjust the pressure plate on the Q711, otherwise it will be difficult to repeat results.

Access Key Switch and Front Panel Membrane Buttons













-  selects test mode. The key can be removed to prevent unauthorized changing of the program.
-  selects program mode for altering the instrument's parameters.
-  selects a menu function.
-  and  step between menu functions, or between characters when editing a name.
-  and  increment/decrement the value of a displayed parameter.
-  selects a special function.

Test Parameters

I. Initial Vacuum Level

An adequate vacuum level is required to enable the test pack to generate a force between the pressure and base plates. This vacuum level should be such that a reasonable force count is achieved, in a reasonable evacuation period. As a rough guide -11psi is a good starting point for MRE's.

The vacuum level may be set by:

1. Set the access key to the  position, to enter **Program** mode.
2. Press the  or  button to select the required program, (1-16)
3. Press the  button to enter the **Program edit** mode.
4. Press the  button until you reach the **Test vacuum** parameter.
5. Press the  or  button to set the required vacuum level.
6. Close the lid and press . The instrument will now learn the vacuum level.
7. When the vacuum level has been set, press  to view the **Evac Time** parameter. This time has automatically been set during the learn phase.
Note what this time is.
8. Press the  until you reach **Evac Tol.** Press the  or  button and set this to approximately 10% of the evacuation time.

II. Gross Reject Level

The Gross reject level should now be set. This is a level at which heavily leaking packs will be identified, and therefore not allowed to pass onto the subsequent decay test. Normally all "good" packs will exhibit a characteristic ability to generate a similar force for a given test vacuum. The Gross reject level is set to just below this force. This reject level is tested for in the stabilization phase. If it is not exceeded, then the pack is considered to contain a large leak path, and will be rejected at this point. Normally, heavily leaking packs will produce little or no measurable force. To set the Gross level:

1. Ensure sections 4.3.1 and 4.3.2 have been completed.
2. Fit an infill (if used), and insert a known "good" pack into the test chamber.
3. Set the access key to the \supset position to enter **Program** mode.
4. Press the \oplus button to enter the **Program edit** mode.
5. Press the \triangleright button until you reach the **Test vacuum** parameter.
6. Close the lid and press \diamond . The test chamber will then be evacuated.
7. When the instrument reaches the end of this phase, it will have automatically set a Gross level.
8. Press the \triangleright button until you reach **Gross**: this will display the gross level setting.

III. Decay Level

The decay phase of the test cycle is designed to detect small leaks in packs. Packs that pass the Gross test will either be good, or contain only a small leak path. During the decay test phase, the force exerted by a leaking pack will decay as its internal air pressure drops. This change in force is monitored over the decay test time. If it is greater than a pre-determined level, the pack will be rejected.

Set the decay level as follows:

1. Ensure that the procedures in sections 4.3.1 to 4.3.3 inclusive have been carried out.
2. Connect a suitable printer to the RS 232 port on the rear of the instrument.
3. Enter the **Set up** mode and press \triangleright until display shows **Serial**.
4. Press \triangle or ∇ to select **Printer**.
5. Press \triangleright until display shows **Reject**.
6. Press \triangle or ∇ to select **Normal**.
7. Press \oplus then \triangleright to enter **Program** mode.
8. Press \oplus then \triangleright until you reach the **Test Time** parameter. Press \triangle or ∇ and set this to 10s.
9. Set the access key to \sqcup to return to **Ready** mode.
10. Using a sample of good packs, put one into the test chamber.
11. Close the lid and press the \diamond button.
12. The instrument should run through a complete test cycle.

13. Repeat this process for 20 - 30 samples.
14. Refer to the printer output: this should give test results for all the packs (see 4.4.4)
15. Plot these results on a graph of decay count by pack number (see fig 4.1 for an example). This will give an indication of where to set the decay limit. In the example shown, the decay for known good packs is between 10 and 20 counts: therefore a decay limit of approximately 30 should ensure that all good packs are passed, and that any packs with a decay of greater than 30 counts are rejected, and are reasonably likely to be leaking.
16. The correct selection of decay limit can be confirmed, if good packs are fitted with laser drilled holes, and then re-tested. Their resulting decay should be greater than the decay limit.

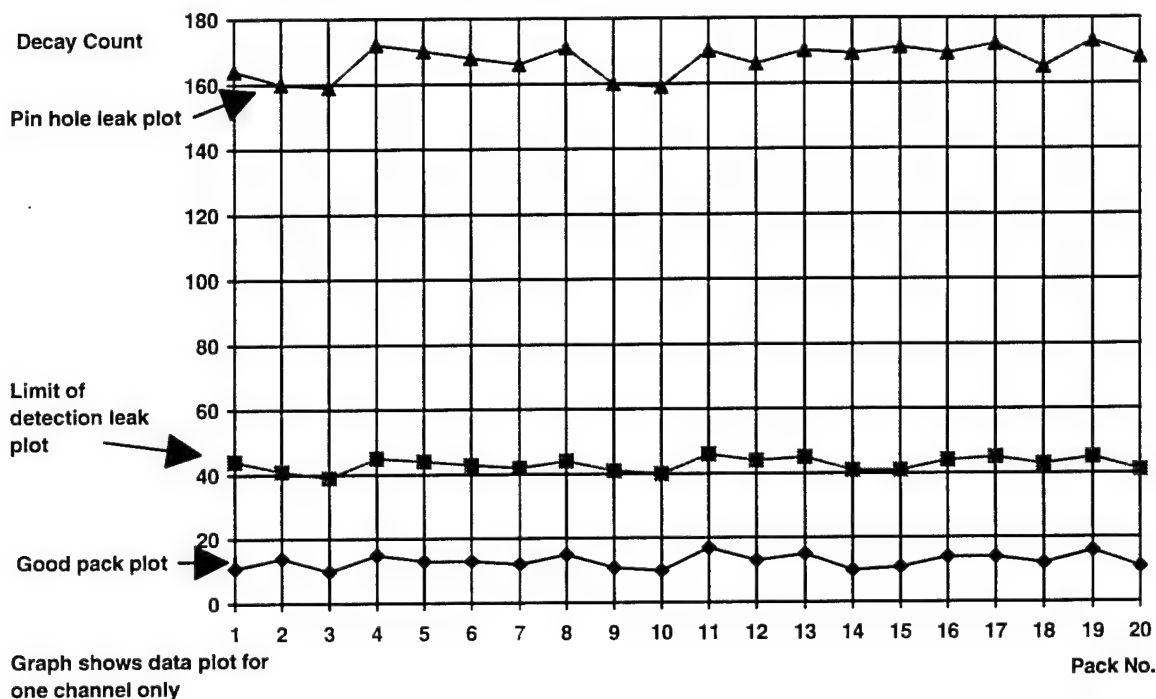


Figure 4.1 Graph of Decay Count by Pack Number

IV. Stabilization Time

This is a period of time after the evacuation phase, and before the test phase. It allows the system and pack to stabilize after the stresses caused by evacuation. Times of between 10 and 20 seconds are normally adequate. (minimum of 4 seconds for MRE pouches).

1. Set Stab to 0 seconds.
2. Set test time to 30 seconds.
3. Insert a known good pack into the test chamber and close the lid.
4. Start a test. When the instrument goes into the Test phase observe the display. If the count goes negative then positive, it indicates the pack material has a response that lags the vacuum (i.e. the force is still increasing). Alternatively if the count suddenly

goes positive and then slows down to a gradual decay (or stays constant), this indicates that the vacuum level is stabilizing, or that the pack may be contracting. In both cases, record the time taken for these effects to take place.

5. Set the Stabilization time to the time previously recorded.

V. Decay Test Time

If no particular test time has been specified, generally a decay test time of a few seconds is normally sufficient to allow the instrument to identify a leaking pack. The test time should be such that the decay readings of known good and known leaking packs (those fitted with a known hole representing the limit of detection) are consistently separated by a factor of two as shown in fig 4.1. Once this operating point has been achieved, there is little advantage in using longer test times as the ratio of decay readings between good and bad packs may not increase

QUALIPAK Q711 Recipe Development Sheet

<u>Parameter</u>	<u>Initial Setting</u>	<u>Recipe</u>
	Product Name	
	Package Size	
	Product ID	
Date		
Qualipak Program #	Select an unused program	
Test Vac (bar)	Start at .85bar	
Evac Time (seconds)	Learned automatically	
Stab Time (seconds)	99 seconds	
Max Res (grams)	None	
Gross (grams)	None	
Decay (grams)	24,000	
Test Time (seconds)	15 seconds	

Appendix 6.4

Specification for Leak Tester for MRE Production Line (MULD)

April 4, 1997

RFP# 7-04-08-2

The State University of New Jersey

RUTGERS

Cook College - Center for Advanced Food Technology

CORANET Program

Specifications

for

Leak Tester For MRE Production Line

This specification covers the requirements for a machine that tests MRE pouches for leaks under the CORANET Program under STP #1005 - "Multiple Unit MRE Leak Detector." The CORANET program demonstration site uses equipment for research and development of new packaging methods and materials.

Rutgers has refined its benchtop vacuum leak test unit, significantly improving the defect detection capability. Modifications have been made to the chamber design, vacuum pump and pouch temperature conditioning. These improvements enhance ability to test; pouches in carton, with very low residual gas, within a 6 second cycle. Testing pouches within the carton has advantages over other locations within the production line:

1. Cartoning is last operation where pouches are directly handled
2. Cartons can be handled automatically without damage to pouch
3. Carton contains product should pouch rupture in leak tester

This specification consists of the following sections:

April 4, 1997

1. Functional Description
2. Performance Requirements
3. Package Information
4. Design Requirements
5. General
6. Acceptance
7. Shipping and Installation

1.0 Functional Description

A multiple station MRE pouch leak test unit will be located at the discharge conveyor of an existing cartoning machine. The attached layout drawing is a desired concept but the vendor is not limited to this concept. The Leak Tester will automatically load pouches into an accumulator station, then index pouches into position within the test cavity. The cavity is closed, forming a sealed vacuum chamber, pressure within the chamber is then quickly reduced by a self contained vacuum system. Response of each pouch is detected by sensor(s) and evaluated by the control system. Accepted pouches are placed on a discharge conveyor for the next operation. Rejected pouches will drop into a tote. In the event of a serious equipment problem pouches will by-pass the Leak Tester without impeding the cartoner.

2.0 Performance Requirements

2.1 Operational Duty. The system shall be designed for continuous operation with a Minimum Operating Efficiency of 98%. Minimum Operating Efficiency is percentage of time that equipment performs at the specified rate.

April 4, 1997

2.2 Leak Detection Accuracy. The system will detect defects with equivalent accuracy as the Rutgers laboratory unit (ATC-3 Leak Detection Unit). This benchmark data is contained in Table 1.

2.3 Production Rate. The system shall inspect a minimum of 100 pouches per minute.

2.4 Operation. The system will run without an operator during normal automatic condition.

3.0 Package Information

3.1 MRE Pouches. Meal, Ready to Eat pouch comply with MIL-P-44073, Primary 8 ounce Type. Pouches are filled with retorted food products such as; beef stew, chicken and rice, ham slice. Pouches contain 0-10cc residual air and inspected at 85°F ±15.

3.2 Cartons. Carton complies with MIL-P-44073. Finished cartons contain one MRE pouch and measure: 4.75" x 0.625" x 8.125"

4.0 Design Requirements

4.1 Material Handling.

4.1.1 General. Pouches and cartons are to be handled without damage. Transfer mechanisms should minimize possible carton jams. Jammed cartons should be easily cleared.

4.1.2 Leak Tester Infeed. Cartons are transferred to the leak tester from an existing cartoner discharge conveyor. Details of the conveyor are not available at this time, assume a 10" wide table top chain conveyor 12' long and 34" high.

4.1.3 Leak Test Discharge Conveyor. Accepted pouches are transferred onto a conveyor that extends 12' beyond the Leak Tester. This conveyor will be supplied with the Leak Tester.

4.1.4 Reject Bin. Pouches that fail the leak inspection will be automatically rejected into a bin or tote.

April 4, 1997

4.2 Controls.

4.2.1 Control Panel. The leak tester will operated from the control panel, switches and indicators may be door mounted. The panel will contain the PLC and/or PC and other electrical components.

4.2.2 Operating Modes.

4.2.2.1 Run. Normal mode when operating production line. Pouches are automatically handled and tested.

4.2.2.2 Jog. A service mode that performs one complete index including leak test.

4.2.2.3 Program. A mode for set up of test parameters and make adjustments.

4.2.3 Information Display. The Leak Tester will indicate machine status on the control panel and/or a light (stop, run, fault). The panel will display specific faults and production/reject count. Fault conditions that must be displayed are; package jam and insufficient vacuum.

4.2.4 Printer. An inkjet printer will provide a written log of leak tester operating settings, time stamped events (start, stop, fault, etc.), checkpoint status (15 min. intervals), total production statistics (pouches tested, accepted, rejected).

4.3 Test Method. The leak tester will subject each cartoned pouch to vacuum, making a determination of leaks using any of following sensing methods; displacement (LVDT), force (load cell), vacuum decay (pressure transducer). Other methods will be considered with supporting data.

4.4 Vacuum System

4.4.1 The leak tester will be supplied with a vacuum pump including piping, valves, accumulator and manifolds as needed.

4.4.2 The final vacuum pressure within the test chamber(s) must be uniform and remain constant during the test.

4.4.3 The final vacuum pressure must be adjustable to 28 inches Hg.

4.4.4 The final vacuum pressure must be reached within 1.0 second.

April 4, 1997

4.5 Construction. The equipment shall be constructed of stainless steel or anodized aluminum. The Leak Tester will be mounted on castors.

4.6 Electrical. Equipment should meet NEMA 4 requirements. The machine shall be wired for 120 or 208V. A main electrical disconnect is required.

4.2 Pneumatic service up to 100 PSI. The vendor is to specify pneumatic requirements.

4.7 Physical dimensions of the proposed equipment are to be provided. Dimensions of the equipment are not to exceed 10' by 10'.

4.8 Cleanability. The equipment shall be designed for easy cleaning.

4.9 Safety. The vendor will provide equipment that is safe to operate. Safety guards, safety interlocks and emergency stop buttons are to be provided where required to prevent injury to operators.

5.0 General

5.1 Cost. The proposal is to include the total cost F.O.B. Rutgers University, Food Manufacturing Technology Facility, Piscataway, NJ. Cost of optional equipment, recommended spare parts, accessories, crating, installation and freight should be individually quoted. Costs for delivery and installation at one of the alternate locations (see Section 7) should be quoted or an allowance taken.

5.2 Delivery Schedule. The vendor will specify the delivery schedule.

5.3 Service. The vendor will provide service as needed to fulfill requirements of the warranty and these specifications.

April 4, 1997

5.4 Manuals. A set of manuals that document equipment operational procedure, maintenance and cleaning procedure will be supplied with the equipment. Machine control software will be documented and an annotated copy provided on floppy disk.

5.5 Drawings, Photos. A complete set of equipment maintenance drawings and schematics will be supplied. A layout drawing of this machine shall be provided in both plan and elevation views. Additional drawings shall be provided as needed. Photos shall be provided as needed.

5.6 Award. Selection will be based on technical evaluation of proposals by the CORANET staff on the following criteria:

- Delivery
- Performance
- Engineering Features
- Cost
- Service
- Training

5.7 Exceptions. The vendor may take exception to a part of this specification without being disqualified from consideration but is to clearly identify any exceptions taken.

5.8 Warranty. The vendor warrants the equipment performance specified herein for one year from the date of acceptance. The warranty includes all equipment and software supplied to be free from defects in materials and workmanship.

6.0 Acceptance

6.1 Preliminary Acceptance Test. An acceptance test at the vendor will be run to determine whether performance requirements have been met.

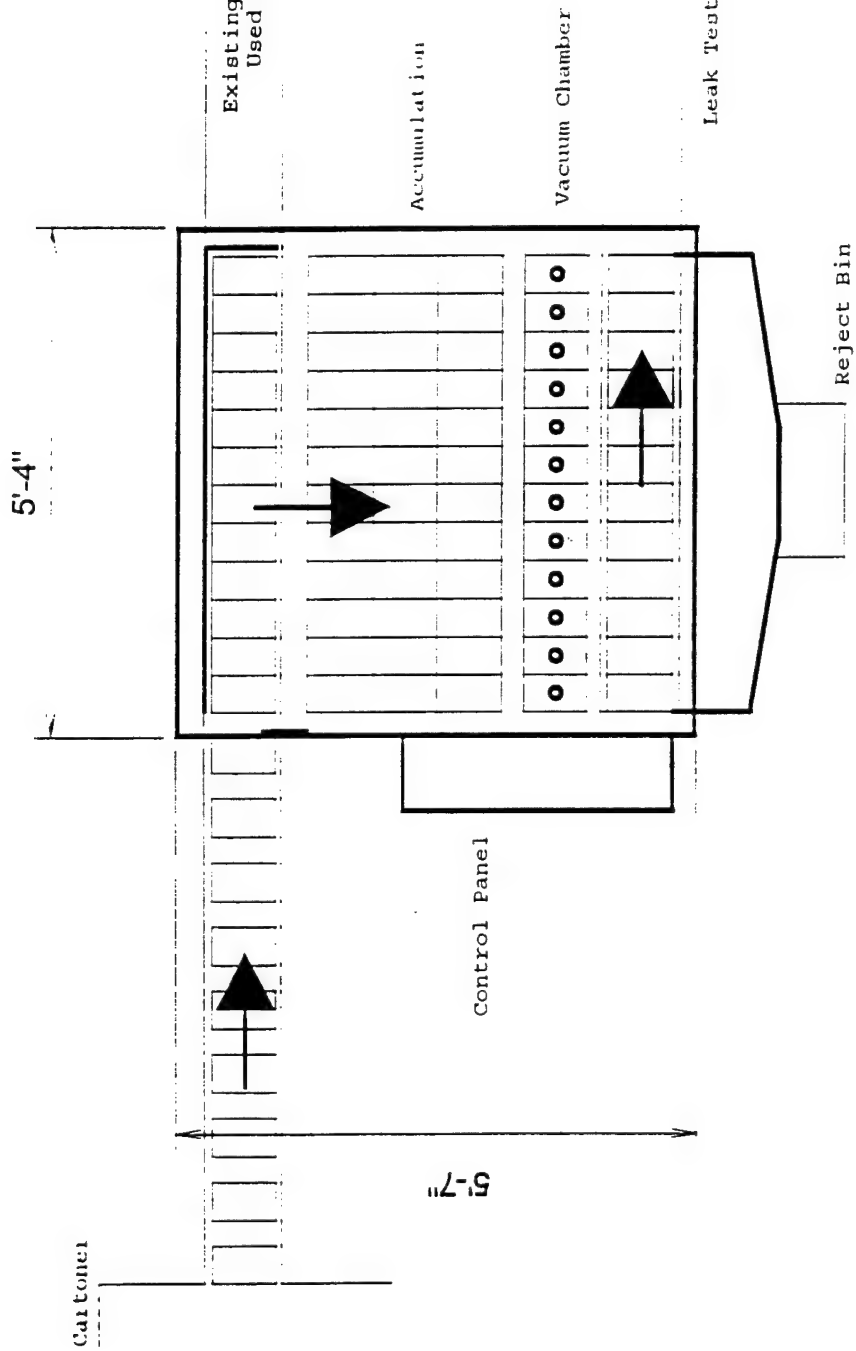
April 4, 1997

6.2 Final Acceptance Test. An acceptance test will be run at the designated production facility. The equipment will test pouches for one hour at the guaranteed rate and accuracy.

7.0 Shipping and Installation

7.1 The equipment will be shipped F.O.B., Rutgers University, Food Manufacturing Technology Facility, 120 New England Ave, Piscataway, NJ 08903 or to a designated production facility at one of the following locations; Evansville IN, Cincinnati OH or Mullins SC.

7.2 The vendor will assemble and install equipment in full working order and provide training to Rutgers and plant personnel in the operation and maintenance of the equipment.



MRE On-Line Leak Test Machine

ATC-3 Benchmark Tests

<u>Variable</u>	<u>Level</u>	<u>Type II Error</u>	<u>Type I Error</u>
All Samples		22%	
Residual Gas	5 cc	28	
	15	25	
	25	14	
Temperature	70 F	25	0
	85	19	0
	100	22	33
Size	300 micron	30	
	600	15	

Type I Error - probability of rejecting a non-defective pouch

Type II Error - probability of accepting a defective pouch

Appendix 6.5

MULD Bid Evaluation

Food Mfg. Technology Facility
120 New England Avenue
BUSCH Campus
EXT. 5-6130

THE STATE UNIVERSITY OF NEW JERSEY


RUTGERS

Interdepartmental Communication

Memorandum

Date: August 18, 1997

To: Mike Dunn
Procurement & Contracting

From: Neal Litman
CAFT/CORANET Program 

Re: Evaluation of Leak Test Machine Proposals,
RFP 7-04-08-2

Evaluation of the proposals for the MRE Pouch Leak Tester have been completed, see attachment for details. The selection criteria was based on delivery (5%), performance (30%), engineering features (30%), cost (20%), service (10%) and training (5%).

Precision Automation's proposal has been selected for contract award of this RFP. The proposal meets equipment specifications and is lowest cost.

cc: J. Coburn

Appendix 6.6

Vendor Proposals for MULD

VENDOR EVALUATION - LEAK TESTER RFP 7-04-08-2

Criteria	Wgt	Precision Auto	%	Rame-Hart	%	ITI - Qualitek	%	PTI - Pkg Tech	%
Cost	20	\$244,900	20	\$336,500	8	\$454,600	0	\$575,500	0
Performance	30	Test leaks 100/min. Meet accuracy specs	25	Test leaks 120/min. Exception to specs	20	Test leaks 100/min. Meet accuracy specs	25	Test leaks 100/min. Meet accuracy specs Detection eff. 85%	30
Features	30	20 vacuum chambers Load cell sensor Nema 4 SS Concept per spec	22	20 vacuum chambers LVDT sensor w/spring Nema 4 SS Concept modified	20	24 vacuum chambers Load cell sensor Nema 4 SS Concept per spec Touch screen display	30	16 vacuum chambers Load cell sensor Nema 4 SS Concept modified Preliminary Vacuum	25
Delivery	5	7 months	4	7 months	4	6.5 months	5	8 months	3
Service	10	manuals provided Allowance \$16,800	8	manuals provided No notation in quote	3	manuals provided On site service	10	manuals provided Standard parts stock	5
Training	5	Allowance \$16,800	5	3 days	2	2 weeks	5	5 days	3
SCORE	100	84		57		75		66	

Employees

175

20

15 U.S.

11 U.S.

Appendix 6.6.1

Precision Automation Proposal

REQUEST-FOR PROPOSAL
THIS IS NOT AN ORDER

RUTGERS — THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
P.O. BOX 6999
PISCATAWAY, NJ 08855-6999

THE R.F.P. NUMBER MUST APPEAR ON ALL
CORRESPONDENCE REGARDING THIS
PROPOSAL

R.F.P. 7-04-08-2

1. RETURN SIGNED PROPOSAL IN A SEALED ENVELOPE. SHOW R.F.P. # ON OUTSIDE OF ENVELOPE.
2. IN EVENT OF THIS PROPOSAL BEING ACCEPTED, A PURCHASE ORDER WILL BE SENT.
3. SEE REVERSE SIDE FOR TERMS & CONDITIONS

4. ANY EXPENSE INCURRED BY THE BIDDER IN CONNECTION WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE BIDDER.
5. IF PROPOSAL IS NOT F.O.B. DESTINATION, YOU MUST SHOW COST OF FREIGHT AS A SEPARATE ITEM.

Precision Automation
Attn: Jack Tarman
1841 Old Cuthbert Road
Cherry Hill, NJ 08034

DATE 4/8/97	THIS R.F.P. WILL BE OPENED: May 2, 1997	2:00 PM	BY <i>Michael Dunn</i> DIRECTOR OF PURCHASES
----------------	--	---------	---

PLEASE QUOTE THE FOLLOWING F.O.B. DESTINATION

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY requests proposals for the design, manufacture and installation of an "MRE Pouch" Leak Tester in accordance with the attached specifications and following notes:

NOTES:

- A. IT SHALL BE THE RESPONSIBILITY OF THE BIDDER TO VERIFY FIELD CONDITIONS PRIOR TO SUBMITTING A BID. SUBMISSION OF A BID INDICATES ACKNOWLEDGEMENT AND AGREEMENT OF THE CONDITIONS TO BE MET AND THAT THE BIDDER FULLY UNDERSTANDS THE EXTENT OF THE OBLIGATION AND NOT MAKE ANY CLAIM FOR, OR HAVE RIGHT TO CANCELLATION OR RELIEF WITHOUT PENALTY OF THE CONTRACT BECAUSE OF ANY MISUNDERSTANDING OR LACK OF INFORMATION.
- B. TECHNICAL QUESTIONS PERTAINING TO SPECIFICATIONS ARE TO BE DIRECTED TO MR. NEAL LITMAN AT (908) 445-6137.
- C. QUESTIONS PERTAINING TO PROPOSAL PROCEDURES ARE DIRECTED TO MR. MICHAEL DUNN AT (908) 445-5070.
- D. THE FOLLOWING MUST BE ADDRESSED IN DETAIL WITH EACH PROPOSAL AND WILL BE CONSIDERED IN THE EVALUATION: DELIVERY, PERFORMANCE, ENGINEERING FEATURES, COST, SERVICE, AND TRAINING.
- E. PRICES ARE TO BE F.O.B. DELIVERED TO RUTGERS UNIVERSITY FOOD MANUFACTURING TECHNOLOGY FACILITY, 120 NEW ENGLAND AVENUE, PISCATAWAY, NEW JERSEY (SEE SECTION 7.0 OF SPECIFICATIONS FOR ALTERNATE SITES.) ADDITIONAL COSTS (IF ANY) ARE TO BE INCLUDED WITH YOUR OPTION PRICES AS DETAILED IN NOTE F.
- F. ALL OPTIONAL EQUIPMENT RECOMMENDED SPARE PARTS, AND ACCESSORIES SHALL BE PRICED INDIVIDUALLY AND INCLUDED ON COMPANY LETTERHEAD AND INCLUDED WITH YOUR PROPOSAL.
- G. BIDDERS ARE REQUESTED TO SUBMIT THREE COMPLETE SETS OF THE PROPOSAL.

PLEASE INDICATE COST OF PROPOSAL AS FOLLOWS:

LUMP SUM \$ 244,900
DELIVERY & INSTALLATION 30 DAYS AND WKS

1. PLEASE NOTE ADDITIONAL TERMS & CONDITIONS ON REVERSE SIDE OF THIS SHEET.
2. ALL RUTGERS UNIVERSITY TERMS AND CONDITIONS WILL BECOME PART OF ANY CONTRACT(S) AWARDED AS A RESULT OF THE REQUEST FOR BID OR PROPOSAL, WHETHER STATED IN PART, IN SUMMARY OR BY REFERENCE. IN THE EVENT THE BIDDER'S TERMS AND CONDITIONS CONFLICT WITH RUTGERS, THE RUTGERS TERMS AND CONDITIONS WILL PREVAIL, UNLESS THE BIDDER IS NOTIFIED IN WRITING OF RUTGERS ACCEPTANCE OF THE BIDDER'S TERMS AND CONDITIONS.
3. ANY EXPENSE INCURRED BY THE VENDOR IN CONNECTION WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE VENDOR.
4. READ THE ENTIRE PROPOSAL INCLUDING ALL TERMS, CONDITIONS AND SPECIFICATIONS.
5. PROPOSAL DOCUMENTS ARE TO BE SUBMITTED IN INK, ANY PRICE ALTERATIONS I.E. WHITEOUTS, CROSSOUTS AND ERASURES MUST BE INITIALED OTHERWISE THE PROPOSAL WILL BE REJECTED. (SEE NUMBER 17, TERMS & CONDITIONS)

SIGNATURE OF THE BIDDER ATTESTS THAT THE BIDDER HAS READ, UNDERSTANDS, AND AGREES TO ALL TERMS, CONDITIONS, AND SPECIFICATIONS SET FORTH IN THE REQUEST FOR PROPOSAL UNLESS OTHERWISE STATED IN WRITING AND SUBMITTED WITH THE PROPOSAL. FURTHERMORE, SIGNATURE BY THE BIDDER SIGNIFIES THAT THIS IS A CONTRACT IMMEDIATELY UPON RECEIPT OF THE PURCHASE ORDER FROM RUTGERS UNIVERSITY FOR ANY OR ALL OF THE ITEMS, AND FOR THE LENGTH OF TIME INDICATED IN THE PROPOSAL. FAILURE TO ACCEPT A CONTRACT WITHIN THE TIME PERIOD INDICATED IN THE PROPOSAL, TO HOLD PRICES OR MEET ANY OTHER TERMS AND CONDITIONS AS DEFINED IN THE PROPOSAL DURING THE TERM OF THE CONTRACT, SHALL CONSTITUTE A BREACH AND WILL RESULT IN SUSPENSION OR DISBARMENT FROM FURTHER BIDDING TO RUTGERS UNIVERSITY.

REFER ALL QUESTIONS REGARDING THIS REQUEST TO:
MICHAEL DUNN/H/(908)445-5070

NOTE: SHOW ALL TAXES AS SEPARATE ITEM

GRAND TOTAL → 244,900.

THIS SPACE TO BE FILLED IN BY BIDDER

SHIPMENT CAN BE MADE IN <u>30 WKS</u> DAYS FROM RECEIPT OF ORDER	We quote you as above subject to the Terms and Conditions on the reverse.
FOR: <u>Piscataway - Delivered</u>	
TERMS: <u>Progress paid per Quote</u>	
SIGNATURE: <u>Jack Tarman</u> (609) 428 7400	
PRINT NAME AND TITLE: <u>JACK TARMAN</u> PHONE NUMBER	
<u>Systems & Controls Div Mgr.</u>	

FOR PROPOSAL
NOT AN ORDER

RUTGERS — THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
P.O. BOX 6999
PISCATAWAY, NJ 08855-6999

THE R.F.P. NUMBER MUST APPEAR ON ALL
CORRESPONDENCE REGARDING THIS
PROPOSAL.

R.F.P. 7-04-08-2

1. RETURN SIGNED PROPOSAL IN A SEALED ENVELOPE. SHOW R.F.P. # ON OUTSIDE OF ENVELOPE.
2. IN EVENT OF THIS PROPOSAL BEING ACCEPTED, A PURCHASE ORDER WILL BE SENT.
3. SEE REVERSE SIDE FOR TERMS & CONDITIONS.

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5. IF PROPOSAL IS NOT F.O.B. DESTINATION, YOU MUST SHOW COST OF FREIGHT AS A SEPARATE ITEM.

Precision Automation
Attn: Jack Tarman
1841 Old Cuthbert Road
Cherry Hill, NJ 08034

DATE	THIS R.F.P. WILL BE OPENED:	2:00 PM	BY
4/8/97	May 2, 1997		
PLEASE QUOTE THE FOLLOWING F.O.B. DESTINATION			DIRECTOR OF PURCHASES

6. THIS (ORIGINAL LEGAL SIZE SHEET) REQUEST FOR PROPOSAL FORM "MUST" BE SIGNED AT THE BOTTOM AND RETURNED WITH THE BID SHEET(S). YOUR ENTIRE BID WILL BE REJECTED AND DISQUALIFIED IF THIS FORM IS "NOT" SIGNED AND RETURNED ON OR BEFORE THE BID DUE DATE AND TIME. FURTHERMORE BIDDERS WHO WISH TO REMAIN ON OUR "QUALIFIED" BIDDERS LIST SHOULD ALSO SIGN AND RETURN THIS BID FORM INDICATING REASON(S) FOR NOT SUBMITTING BIDS OR PROPOSALS.

7. PROPOSALS SHOULD BE RETURNED IN THE ENCLOSED YELLOW ENVELOPE OR ATTACH THE YELLOW ENVELOPE TO THE OUTSIDE OF A LARGE ENVELOPE, IF NECESSARY. TELEGRAPHIC AND FACSIMILE PROPOSALS ARE NOT ACCEPTABLE. BIDDERS MUST SUBMIT SEALED BIDS ONLY. ANY COMMUNICATION (SUCH AS FACSIMILE TRANSMITTAL), WHICH REVEALS THE CONTENTS OF A SEALED PROPOSAL WILL RESULT IN DISQUALIFICATION OF THE ENTIRE PROPOSAL.

8. IT IS THE BIDDERS RESPONSIBILITY TO SEE THAT THEIR PROPOSAL ARRIVES AT THE UNIVERSITY PROCUREMENT & CONTRACTING OFFICE BEFORE THE PROPOSAL OPENING DATE AND TIME.

9. PROPOSALS DELIVERED IN PERSON OR BY EXPRESS SERVICE SHOULD BE TO OUR ACTUAL LOCATION.

THIS LOCATION IS:

RUTGERS-THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
ADMIN. SERVICES ANNEX BLDG. 1 RM. 101
DAVIDSON ROAD/BUSCH CAMPUS
P.O. BOX 6999
PISCATAWAY, NEW JERSEY 08855-6999

10. ALL CASH TERMS WILL BE ACCEPTABLE, HOWEVER, TERMS LESS THAN 3X-30 DAYS WILL NOT BE CONSIDERED IN THE BID AWARD.

11. ANY ADDENDUMS TO THIS REQUEST FOR PROPOSAL MUST BE ACKNOWLEDGED BY SIGNATURE BELOW. FAILURE TO COMPLY WILL RESULT IN REJECTION OF PROPOSAL.

YOU MUST SIGN BELOW FOR EACH ADDENDUM RECEIVED.

ADDENDUM: #1 _____ (Signature)

#2 _____ (Signature)

#3 _____ (Signature)

12. BIDDERS MUST COMPLY WITH ALL PROPOSAL ENCLOSURES AND MUST RETURN CERTAIN ENCLOSURES WITH PROPOSAL FORM. PHOTOCOPIES OF ANY REQUIRED ENCLOSURES ARE NOT VALID. THOSE INDICATED MUST HAVE ORIGINAL SIGNATURES AND NOTARY SEAL. FAILURE TO COMPLY WILL RESULT IN REJECTION OF PROPOSAL.

THEY ARE: (1) N.J. PL 1977 C.33 (MUST BE SIGNED AND RETURNED)
(2) NON-COLLUSION STATEMENT NCS-1 (MUST BE NOTARIZED)
(3) AFFIDAVIT (MUST BE NOTARIZED)

13. A. REQUIREMENT TO BE PROVIDED BY SUCCESSFUL BIDDER AFTER PROPOSAL AWARD IS MADE.

(1) PL 1975 C.127 WITHIN SEVEN (7) DAYS AFTER RECEIPT OF PURCHASE ORDER.
NOTE: "IF AWARDED CONTRACT YOUR COMPANY/FIRM WILL BE REQUIRED TO COMPLY WITH THE REQUIREMENTS OF PL 1975 C.127. (NJAC17:27)"

(2) INSURANCE, AFTER AWARD AND PRIOR TO START OF WORK.

B. SUPPLEMENTAL TERMS & CONDITIONS, FORM STC-1 IS A NOTICE OF REQUIREMENT FOR COMPLIANCE BY BIDDER TO WHOM AN AWARD IS MADE AND IS TO BE RETAINED BY BIDDER.

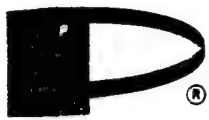
ADDITIONAL ENCLOSURES ARE: DID YOU SHEET/SPECIFICATIONS

14. ALL PROPOSALS SUBMITTED TO RUTGERS UNIVERSITY, PROCUREMENT & CONTRACTING WILL BECOME PUBLIC INFORMATION AS OF THE PROPOSAL OPENING DATE AND TIME.

15. NOTE PERMITS - SEE ATTACHMENT PL1. - ATTACHED _____ NOT APPLICABLE X

REFER ALL QUESTIONS REGARDING THIS REQUEST TO: MICHAEL DUNN/H/(908)445-5070	NOTE: SHOW ALL TAXES AS SEPARATE ITEM	GRAND TOTAL → 244,900
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THIS SPACE TO BE FILLED IN BY BIDDER	
SHIPMENT CAN BE MADE IN <u>30 wks</u> DAYS FROM RECEIPT OF ORDER	We quote you as above subject to the Terms and Conditions on the reverse.
FOB: <u>Delivered - Piscataway</u>	SIGNATURE: <u>Jack Tarman</u> (609) 428-7400
TERMS: <u>Progress pmt per Quote</u>	PRINT NAME AND TITLE: <u>JACK TARMAN</u> PHONE NUMBER: _____
	<u>Systems & Controls Div Myr</u>



PRECISION AUTOMATION CO., INC.

BOX 18
HADDONFIELD, NJ 08033
609-428-7400
FAX 609-428-1270

May 1, 1997

97-0385R0

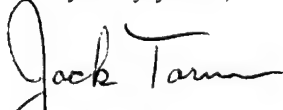
Rutgers - The State University of New Jersey
University Procurement & Contracting
Admin. Services Annex Bldg./Rm. 101
Davidson Road/Busch Campus
PO Box 6999
Piscataway, NJ 08855-6999

RFP #7-04-08-2 - Leak Tester for MRE Production Line

This quote has been prepared after a careful review of all the project requirements. An approach has been developed utilizing extensive machine and control system integration experience. As a result, we believe that this approach will lead to a successful project which will be on target, on time and on budget.

Thank you for this opportunity to provide this quotation. We are looking forward to meeting with you to review this quote in detail and providing our services on this and future projects.

Very truly yours,


Jack Tarman

Copy To:

1. File
2. JET File

PRECISION AUTOMATION CO., INC.
QUOTATION NO. 97-0385 Rev. 0

Quotation for

RUTGERS - THE STATE UNIVERSITY OF NEW JERSEY
Leak Tester for MRE Production Line
RFP #7-04-08-2

Design/Build

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Basis of Quotation:

The following information has either been provided to Precision Automation or is the result of Precision Automation's development of an approach to provide an automation solution within the declared needs and constraints. All of the following information forms the basis of this quotation:

Customer Requirements:

- I. General Requirements:
 - A. This system is to be a Multiple Station Production version of the modified laboratory test units currently being tested at the Rutgers pilot plant.
 - B. Inspection rate is to be a minimum of 100 cartoned pouches per minute.
 - C. The Accuracy is to be equivalent to the Rutgers laboratory unit (ATC-3) as benchmark tested. (Table 1)
 - D. The overall scope is to include full integration of:
 - 1. Material Handling from the discharge of the cartoner.
 - 2. Material Handling for the accumulation prior to testing.
 - 3. Pick & Place for the loading of the tester.
 - 4. Multiple Station Tester with sensors & transducers.
 - 5. Pick & Place for the tester unloading and reject system.
 - 6. Material Handling for the "Passed" discharge.
 - 7. Automation Control Systems.
 - 8. Data Acquisition & Reporting.
 - 9. Installation and Testing.
 - E. Leak detection functionality will be an analysis of the package internal pressure when confined under ambient vacuum conditions. This analysis requires approx. a 6 Sec. cycle time.
- II. Specification for RFP #7-04-08-2 "Leak Tester for MRE Production Line".
- III. Meeting @ Precision Automation on 4/24/97.
 - A. Specification Review.
 - B. Application review.
 - C. Determine needs for additional information.
- IV. Site Visit to Rutgers on 4/28/97.
 - A. Review Laboratory units being tested by Rutgers.
 - B. Review feasibility of alternative approaches.

Approach & Assumptions:

- I. Leak Detection Process:
 - A. Rutgers has been utilizing some laboratory type leak detection units to run benchmark testing of various processes. Modifications have been made to the manufacturers process resulting in improved performance. Conclusions have been drawn and the desired process is as follows:
 - 1. The vacuum must be stabilized very quickly to start the test (Approx. 1 Sec.). This will require the test chambers to be designed with a minimum of air space to be evacuated.

2. The desired measurement for the process variable is force. This will require the expansion of the product tested to be constrained and the resulting pressure will be reflected as a force against the restraining device.
 3. The measured input variables will be the vacuum applied (vacuum transducer) and the resulting force applied against the restraining device.
 4. The determination of "Pass/Fail" will be the result of several variables including the minimum force as well as the change of force during the test period.
 5. There is concern over the temperature of the test package. Variation of temperatures will change the "flash point" which will alter expected results.
- B. Precision Automation is proposing to utilize a PLC interfaced directly with the tester transducers to control the system and monitor the results. This will result in the following benefits:
1. Provide "real time" control and analysis on less than a 200ms sampling rate.
 2. Required filtering of the input signals from the transducers can be incorporated prior to running the "pass/Fail" algorithm instead of trying to correct after running the algorithm.
 3. The PLC data base becomes a valid data base for the data acquisition system.
 4. Operations are not dependent on a PC "on line". If the PC goes down production, leak detection and rejection will continue to function.
 5. **The PLC will be platformed for future enhancements of temperature sensing and vacuum set point control.**
- C. Precision Automation is proposing to utilize an industrialized PC communicating with the PLC for the data archiving and report generation functions.
- II. Precision Automation will utilize extensive experience in automation, controls and data acquisition to properly structure the H/W and S/W of sensors and control (Level 1) and Data Acquisition (Level 2).
- III. Precision Automation will utilize extensive experience in automation, material handling and machine design to design and furnish material handling and pick and place equipment.
- IV. Precision Automation will utilize extensive experience in automation, machine design and sensing to design and furnish a multiple station production MRE leak tester.
- V. Precision Automation will utilize extensive experience in automation and vacuum technology to design and furnish a vacuum system within the defined process constraints.
- VI. This approach leads to the following defined scope:
- A. Preliminary Engineering and prototype testing.

- B. Material Handling from the discharge of the cartoner.
- C. Material Handling for the accumulation prior to testing.
- D. Pick & Place for the loading of the tester.
- E. Multiple Station Tester with sensors & transducers.
- F. Pick & Place for the tester unloading and reject system.
- G. Material Handling for the "Passed" discharge.
- H. Automation Control Systems (PLC & prewired control panel).
- I. Data Acquisition & Reporting (Industrial PC).
- J. Preliminary Acceptance Test @ Precision Automation.
- K. Installation - Included as a defined allowance.
- L. Acceptance Test - Included as a defined allowance.
- M. Training (Operator & Maintenance) - Included as a defined allowance.
- N. Documentation - Drawings, S/W, and manuals (PAC Std).

Related Experience:

- I. Vacuum Systems:
 - A. High speed filling - Filling of industrial batteries with battery acid. Automation of loading battery drawing vacuum on cells to 28" hg, volumetric filling of battery acid, reduce vacuum to atmosphere and unload the full battery.
 - B. Vacuum impregnation - Vacuum impregnation of capacitors. Automation of loading canned capacitors into vacuum chamber, sealing chamber, drawing vacuum to 100 microns, filling can with dielectric oil, reduce vacuum to atmosphere and unload vacuum chamber.
- II. Material Handling:
 - A. Conveyor systems - Multiple projects including live roller, belt, table top, right angle transfer and overhead chain conveyors.
 - B. Pick & Place - Multiple projects including lid removal and replacement, inspection reject and parts assembly machines.
- III. Leak Detection:
 - A. Pressure decay - Detection of seal or package leak using pressure decay. Automation of loading sealed packages into fixture, applying pressure to the sealed package containing gasses and monitoring the deflation of the package.

Risk Management:

Precision Automation incorporates risk management procedures into project execution standards. The structured project execution standards identify risks and provides for pro active management of those risks to help ensure a successful project. The following steps are essential in this project to manage risks:

- I. Precision Automation has the turnkey responsibility for the project management, design, implementation, installation and testing for this project.
- II. **Prototype design and prototype testing - A prototype system will be developed to prove the PLC interface and algorithm utilizing one of the Rutgers laboratory test chamber, and Rutgers product. This would be demonstrated within the first month of the project life cycle.**
- III. Design specifications and drawings will be submitted for review and approval.
- IV. Controls will be interfaced to the leak detector equipment for simulation testing during the preliminary acceptance test at Precision Automation.
- V. Data acquisition equipment will be interfaced to the controls for simulation testing during the preliminary acceptance test at Precision Automation.

Proposed Scope:***Design/Engineering:***

Qn	Description	Mfg	Catalog Number
1	Kick-off Mtg		
1	Prelim. Engr./Prototype Development		
1	Prototype Functional Testing		
1	Vacuum System Design		
1	Carton Accum & Infeed Design		
1	Leak Tester Load Design		
1	Leak Tester Chamber Design		
1	Leak Tester Unload Design		
1	Defective Unit Reject Design		
1	Passed Unit Convey Design		
1	Control System Design	Consisting Of:	
	--S/W - PLC Application Code		
	--Electrical Elementary Wiring Diagram		
	--Panel Layout Drawing		
1	Data Acq. & Report System Design	Consisting Of:	
	--S/W - PC Application Code		
	--Data Base S/W		
	--PC System Specification		
1	Factory Accept Test		
1	As built Documentation Revisions		

Integrated Material Handling Equipment:

Qn	Description	Mfg	Catalog Number
1	Carton Accum & Infeed	Consisting Of:	
	--Counters & Stops		
	--Pushers		
	--Accumulation Table		
1	Leak Tester Load Pick & Place		
1	Leak Tester Unload Pick & Place		
1	Defective Unit Rejecter		
1	Passed Unit Discharge Conveyor		

Integrated Leak Tester Equipment:

Qn	Description	Mfg	Catalog Number
----	-------------	-----	----------------

1 Vacuum System
 20 Leak Tester Chambers
 20 Load Cells
 1 Vacuum Transducer

Integrated Control System:

Qn	Description	Mfg	Catalog Number
----	-------------	-----	----------------

1 Control Panel Enclosure SS			
1 PLC System	Consisting Of:		
--Processor - 5/03	AB		
--Analog I/O - Transducers	AB		
--Communication	AB		
1 Pushbuttons, Pilot Lights, Etc			
1 Terminal Blocks & Misc			

Integrated Data Acquisition System:

Qn	Description	Mfg	Catalog Number
----	-------------	-----	----------------

1 Industrial PC System			
1 Data Acq. S/W	Consisting Of:		
--PLC Communication S/W			
--Data Base S/W			
--Trending S/W			
--Report Generation S/W			

Machine Mounted Control Devices:

Qn	Description	Mfg	Catalog Number
----	-------------	-----	----------------

Photo Eye, Prox Sw, Etc.

Machine Pre-Wiring:

Qn	Description	Mfg	Catalog Number
	1 Item to mount control panel		
	1 Item of Mounting & Wiring Sensors:		Consisting of:
	--Photo Eye		
	--Prox Sw.		
	--Limit Sw., Etc.		
	1 Item of Wiring Actuators:		Consisting of:
	--Motors		
	--Solenoid Valves		
	1 Item of Conduit & Fittings		
	1 Item of Sealtite & Fittings		

Machine Pre-Piping:

Qn	Description	Mfg	Catalog Number
	1 Mount & Pipe Filter Regulator		
	1 Mount & Pipe Solenoid Valves		
	1 Mount & Pipe Cylinders		
	1 Mount & Pipe Manual Valves		
	1 Item of Cu Tubing & Fittings		
	1 Item of Plastic Tubing & Fittings		

Field Service Allowances:

Qn	Description	Mfg	Catalog Number
	20 Days (2 men/2 wks)- Installation		
	4 Days (2 men/2 day) - Acceptance Test		
	4 Days (2 men/2 day) - Training		

Commercial:**Pricing:**

Pricing for project scope as outlined above:

- | | | |
|-------|--|--------------------|
| I. | Complete System- Design, Engineering, Equipment. | \$ 223,100. |
| II. | Field Service Allowance- Inst, Test, Training. | \$ 16,800. |
| III. | Travel & Living Expense Allowance | \$ 4,000. |
| IV. | Shipping to Piscataway, NJ (est.) | \$ 1,000. |
| V. | Complete System Total Price | \$ 244,900. |
| VI. | Travel & Living expenses will be billed against the allowance at cost plus 12%. | |
| VII. | Shipping expenses will be billed against the allowance at cost plus 12%. | |
| VIII. | Field Service and/or Start-Up assistance as <u>additional scope</u> to the above is available upon request and the following is our current rates: | |
| A. | Regular hours including portal to portal travel time. | |
| 1. | Up to 8Hrs/Day | \$ 60.00/Hr |
| 2. | Plus actual travel and living expenses. | |
| B. | Weekday overtime hours/or Saturday including portal to portal travel time. | |
| 1. | Over 8Hrs/Day or Saturday | \$ 70.00/Hr |
| 2. | Plus actual travel and living expenses. | |
| C. | Sunday or holiday hours including portal to portal travel time. | |
| 1. | Anytime | \$ 80.00/Hr |
| 2. | Plus actual travel and living expenses. | |

Payment Terms:

- I. Milestone based progress payment terms are requested. Schedule is to be developed.
- II. Progress Payment Terms - The following milestones are suggested to control progress payments with 10% retention:
 - A. 5% of Total upon order placement
 - B. 25% of Total upon prototype demonstration
 - C. 30% of Total upon Design/Engr completion
 - D. 30% of Total upon Shipping & Installation
 - E. 10% of Total upon Start-Up
- III. Travel and living expenses for Project Management/Engineering/Programming are not included and will be billed as actual expenses with net 30 payment terms

Notes:

- I. General Terms:
 - A. Please Review our "Contract Terms: found in Appendix 1 which are a part of this quotation.
 - B. Note the above prices do not include any state or local sales or use taxes. Licenses, permits or fees, if required, are the customer's responsibility.
 - C. This quotation is based on a straight time, 40 hours per week basis. Should overtime be requested by Customer, an appropriate extra charge will be required. .
 - D. This quotation includes an acceptance run-off at the Precision Automation Co., Inc. plant witnessed by the customer.
 - E. The customer shall have a competent technical support staff to operate and maintain the equipment in their facility.
 - F. Equipment Operation - Purchaser shall use and shall require its employees to use all safety devices and guards on the equipment. Purchaser shall use safe operating procedures. Purchaser shall not remove or modify any such device or guard or warning sign. If purchaser fails to observe any or all of these obligations, purchaser agrees to indemnify and save Precision Automation Co., Inc. harmless from all liability incurred to persons injured directly by operating the Precision Automation Co., Inc. equipment.
 - G. Modifications or alterations to the equipment without the express written consent of the manufacturer is forbidden. Failure to obtain permission in writing voids any warranty, expressed or implied. It also relieves the manufacturer from all liability for said products.
 - H. *If required* - Customer supplied parts shall be to agreed specifications. Precision Automation Co., Inc. cannot be held responsible for equipment operation using out of tolerance components.
 - I. *If installation is included* - All Utilities are the responsibility of the Customer. Utilities are to be within five (5) feet of the control panels and/or machine connections for the system.

May 1, 1997

Quotation No. 97-0385R0

Schedule:

Schedule details are to be developed at the kick off meeting in conjunction with client needs. All pricing is based on the following approximate schedule:

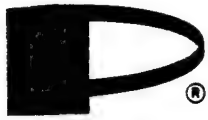
- I. Order placement within 2 wks.
- II. 4 wks - Prototype demonstration.
- III. 8 wks - Design submittal.
- IV. 2 wks - Design approval.
- V. 10 wks - Procurement, Manufacturing, Assembly.
- VI. 2 wks - Preliminary Acceptance Testing.
- VII. 1 wks - Shipping.
- VIII. 2 wks - Installation.
- IX. 1 wks - Acceptance Test, Training
- X. Total Estimated - 30 Weeks

May 1, 1997

Quotation No. 97-0385R0

Appendix I - Contract Terms:

Precision Automation standard "Contract Terms" will apply to this project. (Next Page)



CONTRACT TERMS

1. **PRICES** - F.O.B., as specified. All applicable taxes will be added to the price of the equipment and paid by the Purchaser.
2. **SHIPMENT** - Delivery time specified has been calculated pursuant to the nature of the work required and the experience of Precision Automation Co., Inc. in furnishing the equipment of the kind desired by Purchaser; however, any order must be accepted by us with the understanding that delivery time is our best estimate but is not a guaranteed date. Estimate of time of delivery shall date from our acceptance of written purchase order and receipt of full manufacturing details.
3. **TITLE** - Seller retains title to this equipment until full payment is made. Buyer agrees to protect Seller by maintaining full insurance in the amount of the purchase price, as Seller's interest may appear.
4. **WARRANTY** - Seller warrants equipment of its own manufacture to be free from defects in materials and workmanship. This warranty extends only to the original Buyer and is limited to repair or replacement F.O.B. Seller's factory of any original part or component manufactured by Seller which is found by Seller to have been defective at the time of shipment, provided written claim has been received from Buyer within three (3) months of shipment. With respect to equipment, materials, parts and accessories manufactured by others, Seller will undertake to obtain for Buyer the full benefit of the manufacturer's warranties. Seller will not be liable for any loss of profit, loss by reason of plant shutdown, non-operation or increased expense of operation, loss of product or materials, or other special or consequential loss or damage of any nature, and all claims for such loss or damage are expressly waived by Buyer. Buyer hereby agrees to indemnify and save Seller harmless from any and all liability, loss or damage, expense, causes of action, suits, claims or judgments arising from injury to person or property resulting from the use, operation, delivery, or transportation of the equipment. Buyer expressly agrees to indemnify Seller against and hold Seller harmless from any and all claims and causes of action arising out of or relating to any actual or alleged negligent acts of Seller or arising out of or related to any strict liability in tort imposed upon Seller for placing the equipment in the stream of commerce, having any defect or claimed defect. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.**
5. **CANCELLATION** - Cancellation of orders placed and accepted can be made only with our written consent and upon terms which will indemnify us against loss or damages.
6. **APPROVAL** - This Proposal is subject to change without notice. Any order given shall not constitute a binding contract until order has been received at the office of Precision Automation Co., Inc. and accepted by it in writing.
7. **CONFIDENTIAL** - Technical data and layouts supplied by Seller in connection herewith are confidential pending Buyer's acceptance of this Proposal and may not be used without written consent of Seller.
8. **OSHA LAWS** - The Williams-Steiger Occupational Safety and Health Act of 1970 (OSHA) and like state and local laws and all regulations issued under such laws, are designated to assure a safe place to work and apply primarily to the employer, not the equipment manufacturer. Seller will work with Buyer to find technically feasible answers to possible compliance problems; however, because compliance is significantly affected by many factors over which Seller has little control (such as installation, plant layout, building acoustics, materials processed, processing procedures and supervision and training of employees), Seller does not represent or warrant that equipment sold by it complies with OSHA or any like state or local law or regulation, and the cost of modifications and responsibility for compliance are the Buyer's responsibility.

May 1, 1997

Quotation No. 97-0385R0

Appendix II - Executed "RFP #7-04-08-2":

Original Executed Document included (next page).

May 1, 1997

Quotation No. 97-0385R0

Appendix III - Executed "NJ PL 1977 C.33":

Original Executed Document included (next page).

THIS ENCLOSURE MUST BE COMPLETED, SIGNED, AND RETURNED WITH THE PROPOSAL OR YOUR PROPOSAL WILL BE INVALID.

According to N.J.P.L. 1977, Chapter 33, the vendor must provide a complete list of names and address of all persons who fall into any of the following categories.

(If additional space is required, use separate sheet and attach)

If a Vendor is a Corporation, Vendor hereby certifies that the following is a complete list of the names of stockholders who own 10% or more of its stock, of any class:

NAMES

ADDRESSES

G. FREDERICK REXON, SR.	381 BELLEVUE AVE, HADDONFIELD NJ 08033
G. FREDERICK REXON, JR.	98 LANE OF ACRES, HADDONFIELD NJ 08033
DONNA REXON BRODNER	10107 WATERSIDE DR, BURKE VA 22015

NAME OF CORPORATION PRECISION AUTOMATION CO., INC.

BY G. FREDERICK REXON, JR.

SIGNATURE

DATE 5-2-97

AUTHORIZED REPRESENTATIVE (PRINT)

If the Vendor is a Partnership, Vendor hereby certifies that the following is a list of all partners in Vendor who own 10% or greater interest in the assets, profit, or cash flow of Vendor:

NAMES

ADDRESSES

_____	_____
_____	_____
_____	_____

NAME OF PARTNERSHIP _____

BY _____

AUTHORIZED REPRESENTATIVE (PRINT)

SIGNATURE

DATE _____

Vendor is either a Partnership or a Corporation, and one or more stockholder or partner is itself a Corporation or Partnership, the Vendor must list the stockholders holding 10% or more of that corporation or the individual partners owning a 10% or greater interest in that partnership, as the case may be.

NAMES

ADDRESSES

(STOCK/INTEREST IN)
NAME OF CORPORATION/PARTNERSHIP

_____	_____	_____
_____	_____	_____
_____	_____	_____

SUBMITTED BY: _____

NAME OF FIRM

BY _____

AUTHORIZED REPRESENTATIVE (PRINT)

SIGNATURE

DATE _____

If Vendor has previously provided Rutgers-The State University with the information required by N.J.P.L. 1977 C.33 on this form, and there has been no change of ownership of Vendor since such information was provided, or the vendor is a sole proprietorship, the foregoing is not required, but THE VENDOR MUST SIGN BELOW FOR CERTIFICATION:

Purchase order or RFQ number _____ Date: _____ (If Applicable)

NAME OF FIRM _____

BY _____

AUTHORIZED REPRESENTATIVE (PRINT)

SIGNATURE

DATE _____

Above information must be returned to: RUTGERS-THE STATE UNIVERSITY
University Procurement & Contracting
P.O. Box 6999
Piscataway, NJ. 08855-6999

May 1, 1997

Quotation No. 97-0385R0

Appendix IV - Executed "Non-Collusion Statement NCS-1:

Original Executed and Notarized Document included (next page).

THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS

UNIVERSITY PROCUREMENT AND CONTRACTING • PO BOX 6999 • PISCATAWAY NJ • 08855-6999
(908) 445-3000 • FAX (908) 445-4712

NON-COLLUSION STATEMENT

Date MAY 2, 1997

Rutgers-The State University
University Procurement & Contracting
P.O. Box 6999
Piscataway, NJ. 08855-6999

Dear Supplier:

This is to certify that the undersigned supplier has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competition with this proposal submitted to Rutgers-The State University on the 2ND day of MAY, 19 97.

NAME OF INDIVIDUAL OR COMPANY PRECISION AUTOMATION CO INC

BY G. FREDERICK REXON, JR.
(TYPE)

Signature *G. Frederick Rixon, Jr.*
G. Frederick Rixon, Jr.

Witness: *Darl P. Proulx*
Signature
V.P. Engineering
Title

Sworn to and subscribed before me this 2ND day of MAY, 19 97.

My Commission Expires BARBARA ALLEN
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires Nov. 9, 1999
(Seal)

Barbara Allen
Notary Public

THIS STATEMENT MUST BE COMPLETED, SIGNED, NOTARIZED AND RETURNED WITH PROPOSAL OR YOUR PROPOSAL WILL BE INVALID.

May 1, 1997

Quotation No. 97-0385R0

Appendix V - Executed "Affidavit":

Original Executed Document included (next page).

AFFIDAVIT

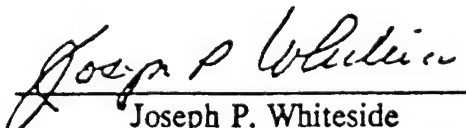
RUTGERS-THE STATE UNIVERSITY OF NEW JERSEY NEW BRUNSWICK, NEW JERSEY

It is the policy of Rutgers-The State University of New Jersey that all projects costing \$2,000.00 or more be performed in accordance with the New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25 ET. SEQ.).

Workers employed in the performance of projects so defined must be paid the prevailing wage for their craft in the area in which the work is to be accomplished. Specific rates are established and maintained current by the Department of Labor and Industry. Contractors engaged in the performance of these projects must provide to Rutgers University certified payroll records in accordance with Prevailing Wage Regulations N.J.A.C. 12:60-6-1. The general contractor is responsible for the submission of certified payroll records of all their hired subcontractors. Rutgers University may remove any vendor from the bidders list for noncompliance with the New Jersey Prevailing Wage Regulations. The wage determination rates are available from the Department of Labor and Industry, Trenton, New Jersey, phone: 609-292-2259.

In addition, the University requires that any contractor bidding or performing work on University projects not discriminate against any employee or applicant because of race, creed, color, religion, national origin, ancestry, age, sex, or liability for military service.

This solicitation for bid is made with the express provision that you comply fully with all of the above requirements and so signify this intent by completing the attached affidavit, which must be returned with the bid.



Joseph P. Whiteside
Senior Vice President and Treasurer

AFFIDAVIT

TO: Rutgers-The State University of New Jersey

The undersigned is a contractor bidding on the contract for LEAK TEST FOR MRE PRODUCTION LINE on the Campus of Rutgers-The State University of New Jersey.

I hereby certify that:

(1) Each and every workman employed by it on the work under this contract will be paid an hourly wage of not less than the prevailing rate of wages established by the Commissioner of Labor and the State of New Jersey.

(2) An accurate record showing the name, craft, or trade, an actual hourly rate of wages paid to each workman employed in connection with this project will be kept by it throughout the construction period of this project. These records will be preserved for a period of three (3) years from the date of completion of the contract. These records will be open at all reasonable hours to inspection by authorized officers and employees of Rutgers-The State University of New Jersey and to the Commissioner of Labor and Industry of New Jersey or his authorized agents.

(3) No employee or applicant will be discriminated against because of race, creed, color, religion, national origin, ancestry, ages, sex, or liability for military service.

(4) The neuter gender when used herein shall include all persons and corporations and words used in the singular shall include words in the plural where the text of the instrument so requires.

THIS ENCLOSURE MUST BE COMPLETED, SIGNED, NOTARIZED AND RETURNED WITH THE BID OR YOUR BID WILL BE INVALID.

State of New Jersey))
County of CAMDEN) SS

IN WITNESS WHEREOF, the said parties have hereunto set their hands or caused these presents to be signed by their proper corporate officers and caused their proper corporate seal to be hereto affixed, the SECOND day of MAY, 1997.

Attest:

(Affix corporate seal)

PO BOX 18, HADDONFIELD, NJ 08033
(Business Address)

(Notary Public)

58

State of New Jersey)) SS
County of _____)

TO BE COMPLETED BY AN INDIVIDUAL OR PARTNERSHIP:

_____ (Witness)	_____ (Individual Principal)
_____ (Address)	_____ (Business Address)
_____ (Witness)	_____ (Name of Partnership)
_____ (Address)	_____ (Business Address)

BY: _____

Sworn and subscribed to me this _____ day of _____
19__.

(Notary Public)

Appendix 6.6.2

Rame-Hart, Inc. Proposal

REQUEST FOR PROPOSAL
THIS IS NOT AN ORDER

RUTGERS — THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
P.O. BOX 6999
PISCATAWAY, NJ 08855-6999

THE R.F.P. NUMBER MUST APPEAR ON ALL
CORRESPONDENCE REGARDING THIS
PROPOSAL

R.F.P. 7-04-08-2

1. RETURN SIGNED PROPOSAL IN A SEALED ENVELOPE. SHOW R.F.P. # ON OUTSIDE OF ENVELOPE.
2. IN EVENT OF THIS PROPOSAL BEING ACCEPTED, A PURCHASE ORDER WILL BE SENT.
3. SEE REVERSE SIDE FOR TERMS & CONDITIONS.
4. ANY EXPENSE INCURRED BY THE BIDDER IN CONNECTION WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE BIDDER.
5. IF PROPOSAL IS NOT F.O.B. DESTINATION, YOU MUST SHOW COST OF FREIGHT AS A SEPARATE ITEM.

Rame-Hart, Inc.
Attn: Rich Pelka
8 Morris Ave.
Mountain Lakes, NJ 07046

DATE 4/8/97	THIS R.F.P. WILL BE OPENED: May 2, 1997	2:00 PM	BY <i>Herbert V. Veeh</i> DIRECTOR OF PURCHASES
----------------	--	---------	--

PLEASE QUOTE THE FOLLOWING F.O.B. DESTINATION

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY requests proposals for the design, manufacture and installation of an "MRE Pouch" Leak Tester in accordance with the attached specifications and following notes:

NOTES:

- A. IT SHALL BE THE RESPONSIBILITY OF THE BIDDER TO VERIFY FIELD CONDITIONS PRIOR TO SUBMITTING A BID. SUBMISSION OF A BID INDICATES ACKNOWLEDGEMENT AND AGREEMENT OF THE CONDITIONS TO BE MET AND THAT THE BIDDER FULLY UNDERSTANDS THE EXTENT OF THE OBLIGATION AND NOT MAKE ANY CLAIM FOR, OR HAVE RIGHT TO CANCELLATION OR RELIEF WITHOUT PENALTY OF THE CONTRACT BECAUSE OF ANY MISUNDERSTANDING OR LACK OF INFORMATION.
- B. TECHNICAL QUESTIONS PERTAINING TO SPECIFICATIONS ARE TO BE DIRECTED TO MR. NEAL LITMAN AT (908) 445-6137.
- C. QUESTIONS PERTAINING TO PROPOSAL PROCEDURES ARE DIRECTED TO MR. MICHAEL DUNN AT (908) 445-5070.
- D. THE FOLLOWING MUST BE ADDRESSED IN DETAIL WITH EACH PROPOSAL AND WILL BE CONSIDERED IN THE EVALUATION: DELIVERY, PERFORMANCE, ENGINEERING FEATURES, COST, SERVICE, AND TRAINING.
- E. PRICES ARE TO BE F.O.B. DELIVERED TO RUTGERS UNIVERSITY FOOD MANUFACTURING TECHNOLOGY FACILITY, 120 NEW ENGLAND AVENUE, PISCATAWAY, NEW JERSEY (SEE SECTION 7.0 OF SPECIFICATIONS FOR ALTERNATE SITES.) ADDITIONAL COSTS (IF ANY) ARE TO BE INCLUDED WITH YOUR OPTION PRICES AS DETAILED IN NOTE F.
- F. ALL OPTIONAL EQUIPMENT RECOMMENDED SPARE PARTS, AND ACCESSORIES SHALL BE PRICED INDIVIDUALLY AND INCLUDED ON COMPANY LETTERHEAD AND INCLUDED WITH YOUR PROPOSAL.
- G. BIDDERS ARE REQUESTED TO SUBMIT THREE COMPLETE SETS OF THE PROPOSAL.

PLEASE INDICATE COST OF PROPOSAL AS FOLLOWS:

LUMP SUM \$ 336,500.00
DELIVERY & INSTALLATION 210 DAYS ARO.

1. PLEASE NOTE ADDITIONAL TERMS & CONDITIONS ON REVERSE SIDE OF THIS SHEET.
2. ALL RUTGERS UNIVERSITY TERMS AND CONDITIONS WILL BECOME PART OF ANY CONTRACT(S) AWARDED AS A RESULT OF THE REQUEST FOR BID OR PROPOSAL, WHETHER STATED IN PART, IN SUMMARY OR BY REFERENCE. IN THE EVENT THE BIDDER'S TERMS AND CONDITIONS CONFLICT WITH RUTGERS, THE RUTGERS TERMS AND CONDITIONS WILL PREVAIL, UNLESS THE BIDDER IS NOTIFIED IN WRITING OF RUTGERS ACCEPTANCE OF THE BIDDER'S TERMS AND CONDITIONS.
3. ANY EXPENSE INCURRED BY THE VENDOR IN CONNECTION WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE VENDOR.
4. READ THE ENTIRE PROPOSAL INCLUDING ALL TERMS, CONDITIONS AND SPECIFICATIONS.
5. PROPOSAL DOCUMENTS ARE TO BE SUBMITTED IN INK, ANY PRICE ALTERATIONS I.E. WHITEOUTS, CROSSOUTS AND ERASURES MUST BE INITIALED OTHERWISE THE PROPOSAL WILL BE REJECTED. (SEE NUMBER 17, TERMS & CONDITIONS)

SIGNATURE OF THE BIDDER ATTESTS THAT THE BIDDER HAS READ, UNDERSTANDS, AND AGREES TO ALL TERMS, CONDITIONS, AND SPECIFICATIONS SET FORTH IN THE REQUEST FOR PROPOSAL UNLESS OTHERWISE STATED IN WRITING AND SUBMITTED WITH THE PROPOSAL. FURTHERMORE, SIGNATURE BY THE BIDDER SIGNIFIES THAT THIS IS A CONTRACT IMMEDIATELY UPON RECEIPT OF THE PURCHASE ORDER FROM RUTGERS UNIVERSITY FOR ANY OR ALL OF THE ITEMS, AND FOR THE LENGTH OF TIME INDICATED IN THE PROPOSAL. FAILURE TO ACCEPT A CONTRACT WITHIN THE TIME PERIOD INDICATED IN THE PROPOSAL, TO HOLD PRICES OR MEET ANY OTHER TERMS AND CONDITIONS AS DEFINED IN THE PROPOSAL DURING THE TERM OF THE CONTRACT, SHALL CONSTITUTE A BREACH AND WILL RESULT IN SUSPENSION OR DISBARMENT FROM FURTHER BIDDING TO RUTGERS UNIVERSITY.

REFER ALL QUESTIONS REGARDING THIS REQUEST TO: MICHAEL DUNN/H/(908)445-5070	NOTE: SHOW ALL TAXES AS SEPARATE ITEM	GRAND TOTAL → \$336,500.00
--	---------------------------------------	----------------------------

THIS SPACE TO BE FILLED IN BY BIDDER

SHIPMENT CAN BE MADE IN <u>210</u> DAYS FROM RECEIPT OF ORDER	We quote you as above subject to the Terms and Conditions on the reverse.	
FOR Mountain Lakes, NJ	SIGNATURE: <i>Ken Christiansen</i>	PHONE NUMBER
TERMS: See Sheet 6 of 8 Section 3.2	PRINT NAME AND TITLE Ken Christiansen	201-335-0560

**REQUEST FOR PROPOSAL
THIS IS NOT AN ORDER**

**RUTGERS — THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
P.O. BOX 6999
PISCATAWAY, NJ 08855-6999**

THE R.F.P. NUMBER MUST APPEAR ON ALL
CORRESPONDENCE REGARDING THIS
PROPOSAL
R.F.P. 7-04-08-2

1. RETURN SIGNED PROPOSAL IN A SEALED ENVELOPE. SHOW R.F.P. # ON OUTSIDE OF ENVELOPE
2. IN EVENT OF THIS PROPOSAL BEING ACCEPTED, A PURCHASE ORDER WILL BE SENT.
3. SEE REVERSE SIDE FOR TERMS & CONDITIONS.

4. ANY EXPENSE INCURRED BY THE BIDDER IN CONNECTION WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE BIDDER.
5. IF PROPOSAL IS NOT F.O.B. DESTINATION, YOU MUST SHOW COST OF FREIGHT AS A SEPARATE ITEM.

Rame-Hart, Inc.
Attn: Rich Pelka
8 Morris Ave.
Mountain Lakes, NJ 07046

DATE 4/8/97	THIS R.F.P. WILL BE OPENED: May 2, 1997	2:00 PM	BY DIRECTOR OF PURCHASES
PLEASE QUOTE THE FOLLOWING F.O.B. DESTINATION			

6. THIS (ORIGINAL LEGAL SIZE SHEET) REQUEST FOR PROPOSAL FORM "MUST" BE SIGNED AT THE BOTTOM AND RETURNED WITH THE BID SHEET(S). YOUR ENTIRE BID WILL BE REJECTED AND DISQUALIFIED IF THIS FORM IS "NOT" SIGNED AND RETURNED ON OR BEFORE THE BID DUE DATE AND TIME. FURTHERMORE BIDDERS WHO WISH TO REMAIN ON OUR "QUALIFIED" BIDDERS LIST SHOULD ALSO SIGN AND RETURN THIS BID FORM INDICATING REASON(S) FOR NOT SUBMITTING BIDS OR PROPOSALS.
7. PROPOSALS SHOULD BE RETURNED IN THE ENCLOSED YELLOW ENVELOPE OR ATTACH THE YELLOW ENVELOPE TO THE OUTSIDE OF A LARGE ENVELOPE, IF NECESSARY. TELEGRAPHIC AND FACSIMILE PROPOSALS ARE NOT ACCEPTABLE. BIDDERS MUST SUBMIT SEALED BIDS ONLY. ANY COMMUNICATION (SUCH AS FACSIMILE TRANSMITTAL), WHICH REVEALS THE CONTENTS OF A SEALED PROPOSAL WILL RESULT IN DISQUALIFICATION OF THE ENTIRE PROPOSAL.
8. IT IS THE BIDDERS RESPONSIBILITY TO SEE THAT THEIR PROPOSAL ARRIVES AT THE UNIVERSITY PROCUREMENT & CONTRACTING OFFICE BEFORE THE PROPOSAL OPENING DATE AND TIME.
9. PROPOSALS DELIVERED IN PERSON OR BY EXPRESS SERVICE SHOULD BE TO OUR ACTUAL LOCATION.

THIS LOCATION IS: RUTGERS-THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
ADMIN. SERVICES ANNEX BLDG. 1 RM. 101
DAVIDSON ROAD/BUSCH CAMPUS
P.O. BOX 6999
PISCATAWAY, NEW JERSEY 08855-6999

10. ALL CASH TERMS WILL BE ACCEPTABLE, HOWEVER, TERMS LESS THAN 3%-30 DAYS WILL NOT BE CONSIDERED IN THE BID AWARD.
11. ANY ADDENDUMS TO THIS REQUEST FOR PROPOSAL MUST BE ACKNOWLEDGED BY SIGNATURE BELOW. FAILURE TO COMPLY WILL RESULT IN REJECTION OF PROPOSAL.

YOU MUST SIGN BELOW FOR EACH ADDENDUM RECEIVED.

ADDENDUM: #1 *[Signature]* (Signature)
#2 _____ (Signature)
#3 _____ (Signature)

12. BIDDERS MUST COMPLY WITH ALL PROPOSAL ENCLOSURES AND MUST RETURN CERTAIN ENCLOSURES WITH PROPOSAL FORM. PHOTOCOPIES OF ANY REQUIRED ENCLOSURES ARE NOT VALID. THOSE INDICATED MUST HAVE ORIGINAL SIGNATURES AND NOTARY SEAL. FAILURE TO COMPLY WILL RESULT IN REJECTION OF PROPOSAL.

THEY ARE: (1) N.J. PL 1977 C.33 (MUST BE SIGNED AND RETURNED)
(2) NON-COLLUSION STATEMENT NCS-1 (MUST BE NOTARIZED)
(3) AFFIDAVIT (MUST BE NOTARIZED)

13. A. REQUIREMENT TO BE PROVIDED BY SUCCESSFUL BIDDER AFTER PROPOSAL AWARD IS MADE.

(1) PL 1975 C.127 WITHIN SEVEN (7) DAYS AFTER RECEIPT OF PURCHASE ORDER.
NOTE: "IF AWARDED CONTRACT YOUR COMPANY/FIRM WILL BE REQUIRED TO COMPLY WITH THE REQUIREMENTS OF PL 1975 C.127. (NJAC17:27)"
(2) INSURANCE, AFTER AWARD AND PRIOR TO START OF WORK.

- B. SUPPLEMENTAL TERMS & CONDITIONS, FORM STC-1 IS A NOTICE OF REQUIREMENT FOR COMPLIANCE BY BIDDER TO WHOM AN AWARD IS MADE AND IS TO BE RETAINED BY BIDDER.

ADDITIONAL ENCLOSURES ARE: DID YOU SHEET/SPECIFICATIONS

14. ALL PROPOSALS SUBMITTED TO RUTGERS UNIVERSITY, PROCUREMENT & CONTRACTING WILL BECOME PUBLIC INFORMATION AS OF THE PROPOSAL OPENING DATE AND TIME.

15. NOTE PERMITS - SEE ATTACHMENT PL1. - ATTACHED _____ NOT APPLICABLE X

REFER ALL QUESTIONS REGARDING THIS REQUEST TO: MICHAEL DUNN/H/(908)445-5070	NOTE: SHOW ALL TAXES AS SEPARATE ITEM	GRAND TOTAL →
--	---------------------------------------	---------------

THIS SPACE TO BE FILLED IN BY BIDDER

SHIPMENT CAN BE MADE IN _____ DAYS FROM RECEIPT OF ORDER	*We quote you as above subject to the Terms and Conditions on the reverse.	
FOB:	SIGNATURE:	PHONE NUMBER
TERMS:	PRINT NAME AND TITLE	

A Proposal to Build Leak Tester For MRE Production Line.

1. Introduction

1.1. Executive Summary

This proposal is submitted by Rame Hart, Inc. (RH) who will act as primary contractor for designing and building the PLC-driven MRE package tester. Leak detection will be licensed from Applied Technology Concepts, Inc. who will act as consultants.

This bid includes a fully integrated turn key automatic MRE Leak Detection system which will meet most of the design specification of the Coronet Program. The system we propose will have the following features:

- A fully coordinated vendor solution which meets the major design goals of the CORANET Program under STP #1005 - "Multiple Unit MRE Leak Detector"
- Standard hardware, software and mechanical design backed up by RH utilizing ATC-3 in Leak detection technology.
- Software architecture which is modular in design and which may be expanded for use more stringent leak detection conditions with no hardware modifications.
- Easy maintainable and documented software.

We believe the success of the project will depend largely on the cooperation, experience and dedication of the team members as well as the excellence of the design. RH has experience in designing such instrumentation and a history of working well with Applied Technology Concepts staff. We value the opportunity to work for the Center for Food Technology of Rutgers University.

1.2. Company Background

RH has been in business since 1961 and is a precision quality custom machine shop that is highly qualified to provide design, mechanical assembly and electrical assembly services. It has an international reputation as a manufacturer of surface science instrumentation. Other project and/or products include robotic leak detection systems, industrial egg inoculation, harvesting and inspection systems as well as vacuum stoppering equipment for syringes. Sales are \$2.2 MM and number of employees are twenty.

1.3. Basis of Proposal

Our proposal is based on R.F.P.7-04-08-2 and Specifications for Leak Tester For MRE Production Line.

1.4. General Method of Operation

We propose to build a machine consisting of two vacuum chambers. Each vacuum chamber will be provided with 10 linear displacement and one vacuum transducer. A schematic overall drawing is attached. MRE packages will be placed in the chamber by automatic sample handling equipment. The chamber will be evacuated and the expansion of the packages as well as the vacuum will be monitored and tested by proven ATC 3 technology. The result will be communicated to the package handling machinery for placement in a reject bin or for handing them over to the production.

2. Operational Details

2.1. Sample Handling Means

Means will be provided to gate the *cartoner* exit conveyor till 10 packages accumulate at the gate barrier for each chamber. Once the accumulation is complete, the samples will be transferred by suitable pneumatically operated or servo mechanisms to the base plate under the vacuum head. The base plate is raised against the vacuum head and the test is carried out.

At the conclusion of the test the base plate is lowered and the samples are either transferred to the output conveyor or to a reject bin by another pneumatic or servo operated mechanism on the other side of the base plate.

It is expected that the sample orientation on the input conveyor belt will have the long dimension perpendicular to the direction of motion. The overall efficiency and jamming specifications will only apply to intact packages. Catastrophic package failure due to improper manufacturing in prior steps will not be considered in computing the jamming and efficiency specification.

2.2. Vacuum Chamber

Each vacuum chamber will consist of 10 linear displacement and one vacuum transducer which will contact aluminum plates that are fixed to the top of the chamber with an appropriate spring. It is expected that the sample handling mechanism will place 10 samples on a metal base plate of each chamber, so that when the base plate is raised the samples would contact the spring /metal top plates. The spring compression and linear displacement transducer strokes will be

Table 1 Final Vacuum in Chamber for Varies Size Pumps			
Time in Sec	5 HP	10 HP	20 HP
0	0	0	0
1.00	24.80	27.34	28.86
2.00	29.04	29.70	29.88
3.00	29.77	29.90	29.92
4.00	29.90	29.92	29.92
5.00	29.92	29.92	29.92
6.00	29.92	29.92	29.92

designed to accommodate the expansion of the packages at the operating vacuum.

The two vacuum chambers have an approximate volume of one cubic foot and will pump down to the bid specifications. A 20 HP pump will be used which is bulky and unnecessary. Table 1 shows pump down vacuum levels in inches of Hg for various size pumps. If we were permitted to utilize a 5 HP pump, for example, we will reduce the cost of the project by \$15,000.

2.3. PLC Operation

Machine sequence will be controlled by a PLC. Additionally, the PLC will control the operator interface and control the operation of the PC which will be completely transparent to the operator.

2.3.1. Operator Interface and Adjustment

The operator interface will have

1. On/off switch
2. Panic buttons
3. Automatic/single cycle mode switch
4. Power on light

5. Automatic operation pilot light
6. Single mode operation
7. PC fault light
8. Insufficient vacuum pilot light
9. Defective package counter and reset button
10. Acceptable package counter and reset button
11. Vacuum gauge (not necessarily located in panel)
12. Means for controlling vacuum level (not necessarily located in panel)
13. Printer enable/disable switch.

2.3.2. PLC/PC Communication

Will be performed by a serial interface or TTL logic. Signals between the PC and PLC will handle, start test, test results, and fault communication. Depending on the location of the printer additional signals may be required to report operational parameters and package counters.

2.4. Defect Discrimination

Leak testing will be performed by two 10 cavity Electronic Package Testers similar to the one cavity ATC-3 tester used to generate the benchmark tests referred to in the bid specifications. Both the vacuum and the linear displacement transducers will be monitored by a suitable A/D converter board which will be installed in the a PC bus.

Data collection in the PC will be initiated by a signal from the PLC. ATC-3 proprietary algorithms will be used to discriminate between leaking and intact packages. The test results will be communicated to the PLC so that they will be either returned to the production line or diverted to a reject bin.

The PC will have the normal compliment of commercial ATC-3 software products which could be used for diagnostic purposes. It cannot be emphasized strongly enough that it would be very advantageous to the overall program to use a PC which can be loaded with advanced sophisticated leak detection software, to detect much smaller leaks than what is currently required without hardware modification. The existence of the PC will be transparent to the operator. It would be placed in the NEMA 4 cabinet and will be available to the engineering/maintenance and supervisory staff only.

It is necessary to load the normal ATC-3 threshold and operational parameters directly into the PC. These parameters once established will very rarely change.

Defect discrimination will be performed with equivalent accuracy to Rutgers ATC-3 bench model subject to the following conditions

1. The package contains a minimum of 2% residual gas
2. The food is chicken rice meal
3. The package temperature is between 88 and 92 degrees Fahrenheit.

The absolute temperature level is not as important as the variation in package temperature. It is difficult if not impossible to heat treat the packages in the space specified by the list of specifications. If we find that the operational temperature is different than the one quoted above then experimental protocols have to be established for each temperature range. As an operational aid, we can adjust the software parameters from an appropriate look up table. The look up table will be generated during initial trials as per field conditions.

Since the discrimination algorithms are heuristic and empirical, scale up factors may come into play which could give different results than the benchmark figures quoted in the specifications. Some of these figures were generated at considerably greater cycle time than 6 second. Both residual gases and pouch temperature will impact on the expansion of the pouches. Mass transfer of material (preferably gaseous) will have a considerable impact on the sensitivity and accuracy of discrimination. Vacuum conditions must be selected depending on the amount of residual gas and the temperature of the pouches as they are produced in the field. The greater the uniformity of pouch temperature the higher the accuracy of detection.

2.5. Report Print Out

A report will be printed out every 15 minutes which will contain the following information:

- 1) A time stamp for when the report is printed.
- 2) Report the total number of packages that passed (since reset or since last report ?)
- 3) Report the total number of packages that failed (since reset or since last report ?)
- 4) Time stamped error conditions since last report.
- 5) Operating parameters which are set in the PC.

3. Project Services

3.1.1. Acceptance Testing and Operation

Adequate free space surrounding the machine for debugging as well as all utility hook ups will be provided by the manufacturing site. Unlimited access and exclusive use of the test area should be provided during normal working hours. Acceptance testing will be conducted at the at the RH facility in Mountain Lakes, NJ.

3.2. Project Cost

TOTAL COST FOR INSTALLATION AT MRE MANUFACTURING SITE \$336,500.00

Payment shall be made as per the following schedule. 35% with the purchase order, 30% after the completion of hardware construction. 30% upon acceptance at the RH facility. 5% upon final delivery.

3.2.1. Comment

1. Performance acceptance will be conducted at our Mountain Lakes, NJ facility and are included in the above costs
2. These costs include three man days of training.
3. Staff billing costs for additional services are \$800 per day for senior staff and \$400 per day for engineering staff. Fractional days will be billed at \$90 and \$ 50 per hour including travel time up to the daily rate. These rates are for work done between 8 AM - 5 PM on Monday - Friday. CAFT or manufacturing requested work outside these hours will be billed at a 50% higher rate.
4. Mechanical and/or electrical modifications to the MRE test machine after acceptance at our facility or at the final installation site or modification to the electrical and mechanical operation of the MRE test machine outside the scope detailed above will be at the expense of CAFT or the target plant.

5. On site installation can begin some 30 weeks after receipt of purchase order and first payment.
6. This proposal is valid for 60 days and is subject to our standard terms and conditions a copy of which is attached.

3.3. Project Support

3.3.1. Project Management

A project manager will be appointed by RH. Our approach to implementation is to assemble a team of our staff to perform implementation. We expect that CAFT will designate a representative who will join the team when appropriate. The project manager assumes overall responsibility for the project and serves as a single point of contact for all issues. This way communications can be efficient and controlled. The project manager will be responsible to CAFT.

3.3.2. Documentation

3.3.2.1. Electrical and Mechanical Drawings

Electric Wiring Diagrams, Mechanical Drawing, Signal Wire Drawings and Pinout Tables will be provided.

3.3.2.2. Software Programming and Installation

Diskette will be provided which would contain Setup programs and installation instructions.. While machine operational control software for the PLC will be provided in source code and annotated. ATC-3 proprietary discrimination software will only be provided in executable image format.

3.3.2.3. Operator and Maintenance Manuals

Two sets of operator and Maintenance manuals will be provided which includes a detailed written description of the MRE Tester. Data sheets will be provided for the system when

supplied by the vendor. The data sheets will as minimum include the component name, manufacturer, model number, quantity and any special characteristics.

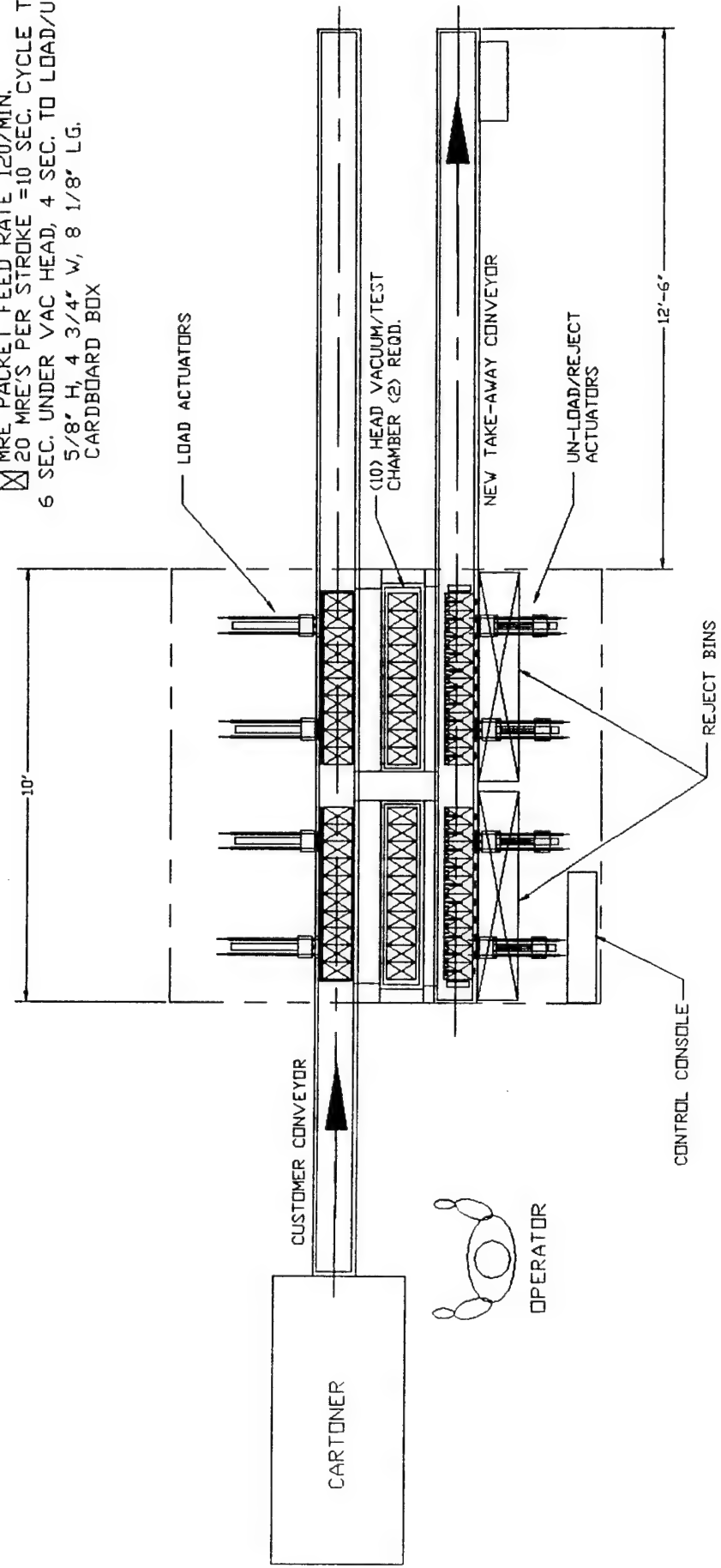
3.4. Training

RH can supply extended training program beyond the three days for operators, maintenance engineers and supervisory personnel to be conducted by qualified personnel either at CAFT facility or at Mountain Lakes NJ at the billing schedule outlined above.

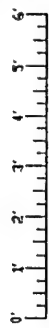
3.5. Maintenance

An annual software maintenance program and/or a telephone software assistance program can be supplied. The cost will be dependent on the kind of service required.

☑ MRE PACKET FEED RATE 120/MIN.
20 MRE'S PER STROKE = 10 SEC. CYCLE TIME
6 SEC. UNDER VAC HEAD, 4 SEC. TO LOAD/UN-LOAD
5/8" H, 4 3/4" W, 8 1/8" L.G.
CARDBOARD BOX



RAME-HART, INC.			
ATC/MRE CONCEPT-2			
DATE	1/16/97	SCALE	1/2" = 1'-0"
R.P.	XX	FINISH	1/2"
TITLE	LAYOUT		
907-003-000			



Appendix 6.6.3

ITI-Qualitek Proposal

REQUEST FOR PROPOSAL
THIS IS NOT AN ORDER

RUTGERS — THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
P.O. BOX 6999
PISCATAWAY, NJ 08855-6999

THE R.F.P. NUMBER MUST APPEAR ON ALL
CORRESPONDENCE REGARDING THIS
PROPOSAL.

R.F.P. 7-04-08-2

RETURN SIGNED PROPOSAL IN A SEALED ENVELOPE. SHOW
R.F.P. # ON OUTSIDE OF ENVELOPE.

IN EVENT OF THIS PROPOSAL BEING ACCEPTED, A PURCHASE
ORDER WILL BE SENT.

3. SEE REVERSE SIDE FOR TERMS & CONDITIONS.

**WE HAVE
MOVED**

PLEASE MAKE A
NOTE OF OUR
NEW ADDRESS,
PHONE AND FAX

**ITI
QUALITEK**
267 Boston Road
Billerica, MA 01862-2310
tel 508-670-1113
fax 508-670-1114

4. ANY EXPENSE INCURRED BY THE BIDDER IN CONNECTION
WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE
BIDDER.

5. IF PROPOSAL IS NOT F.O.B. DESTINATION, YOU MUST SHOW
COST OF FREIGHT AS A SEPARATE ITEM.

ITI Qualitek
Attn: David Norris
240 Fordham Road—
Wilmington, MA 01887

DATE /8/97	THIS R.F.P. WILL BE OPENED: May 2, 1997	2:00 PM	BY <i>Herman Veigh</i> DIRECTOR OF PURCHASES
---------------	--	---------	---

PLEASE QUOTE THE FOLLOWING F.O.B. DESTINATION

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY requests proposals for the design, manufacture and installation of an "MRE
Pouch" Leak Tester in accordance with the attached specifications and following notes:

NOTES:

IT SHALL BE THE RESPONSIBILITY OF THE BIDDER TO VERIFY FIELD CONDITIONS PRIOR TO SUBMITTING A BID. SUBMISSION OF A BID INDICATES
ACKNOWLEDGEMENT AND AGREEMENT OF THE CONDITIONS TO BE MET AND THAT THE BIDDER FULLY UNDERSTANDS THE EXTENT OF THE OBLIGATION AND
NOT MAKE ANY CLAIM FOR, OR HAVE RIGHT TO CANCELLATION OR RELIEF WITHOUT PENALTY OF THE CONTRACT BECAUSE OF ANY MISUNDERSTANDING
OR LACK OF INFORMATION.

TECHNICAL QUESTIONS PERTAINING TO SPECIFICATIONS ARE TO BE DIRECTED TO MR. NEAL LITMAN AT (908) 445-6137.

C. QUESTIONS PERTAINING TO PROPOSAL PROCEDURES ARE DIRECTED TO MR. MICHAEL DUNN AT (908) 445-5070.

THE FOLLOWING MUST BE ADDRESSED IN DETAIL WITH EACH PROPOSAL AND WILL BE CONSIDERED IN THE EVALUATION: DELIVERY, PERFORMANCE,
ENGINEERING FEATURES, COST, SERVICE, AND TRAINING.

E. PRICES ARE TO BE F.O.B. DELIVERED TO RUTGERS UNIVERSITY FOOD MANUFACTURING TECHNOLOGY FACILITY, 120 NEW ENGLAND AVENUE,
PISCATAWAY, NEW JERSEY (SEE SECTION 7.0 OF SPECIFICATIONS FOR ALTERNATE SITES.) ADDITIONAL COSTS (IF ANY) ARE TO BE INCLUDED
WITH YOUR OPTION PRICES AS DETAILED IN NOTE F.

ALL OPTIONAL EQUIPMENT RECOMMENDED SPARE PARTS, AND ACCESSORIES SHALL BE PRICED INDIVIDUALLY AND INCLUDED ON COMPANY
LETTERHEAD AND INCLUDED WITH YOUR PROPOSAL.

BIDDERS ARE REQUESTED TO SUBMIT THREE COMPLETE SETS OF THE PROPOSAL.

PLEASE INDICATE COST OF PROPOSAL AS FOLLOWS:

LUMP SUM \$ 454,600 (see attached proposal)
DELIVERY & INSTALLATION 196 DAYS ARO. (see attached proposal)

1. PLEASE NOTE ADDITIONAL TERMS & CONDITIONS ON REVERSE SIDE OF THIS SHEET.

ALL RUTGERS UNIVERSITY TERMS AND CONDITIONS WILL BECOME PART OF ANY CONTRACT(S) AWARDED AS A RESULT OF THE REQUEST FOR BID OR
PROPOSAL, WHETHER STATED IN PART, IN SUMMARY OR BY REFERENCE. IN THE EVENT THE BIDDER'S TERMS AND CONDITIONS CONFLICT WITH RUTGERS,
THE RUTGERS TERMS AND CONDITIONS WILL PREVAIL, UNLESS THE BIDDER IS NOTIFIED IN WRITING OF RUTGERS ACCEPTANCE OF THE BIDDER'S TERMS
AND CONDITIONS.

ANY EXPENSE INCURRED BY THE VENDOR IN CONNECTION WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE VENDOR.

4. READ THE ENTIRE PROPOSAL INCLUDING ALL TERMS, CONDITIONS AND SPECIFICATIONS.

PROPOSAL DOCUMENTS ARE TO BE SUBMITTED IN INK, ANY PRICE ALTERATIONS I.E. WHITEOUTS, CROSSOUTS AND ERASURES MUST BE INITIALED
OTHERWISE THE PROPOSAL WILL BE REJECTED. (SEE NUMBER 17, TERMS & CONDITIONS)

SIGNATURE OF THE BIDDER ATTESTS THAT THE BIDDER HAS READ, UNDERSTANDS, AND AGREES TO ALL TERMS, CONDITIONS, AND SPECIFICATIONS SET FORTH
IN THE REQUEST FOR PROPOSAL UNLESS OTHERWISE STATED IN WRITING AND SUBMITTED WITH THE PROPOSAL. FURTHERMORE, SIGNATURE BY THE BIDDER
SIGNIFIES THAT THIS IS A CONTRACT IMMEDIATELY UPON RECEIPT OF THE PURCHASE ORDER FROM RUTGERS UNIVERSITY FOR ANY OR ALL OF THE ITEMS,
AND FOR THE LENGTH OF TIME INDICATED IN THE PROPOSAL. FAILURE TO ACCEPT A CONTRACT WITHIN THE TIME PERIOD INDICATED IN THE PROPOSAL,
HOLD PRICES OR MEET ANY OTHER TERMS AND CONDITIONS AS DEFINED IN THE PROPOSAL DURING THE TERM OF THE CONTRACT, SHALL CONSTITUTE A
Breach AND WILL RESULT IN SUSPENSION OR DISBARMENT FROM FURTHER BIDDING TO RUTGERS UNIVERSITY.

REFER ALL QUESTIONS REGARDING THIS REQUEST TO: MICHAEL DUNN/H/(908)445-5070	NOTE: SHOW ALL TAXES AS SEPARATE ITEM	GRAND TOTAL → \$454,600
--	---------------------------------------	-------------------------

THIS SPACE TO BE FILLED IN BY BIDDER

SHIPMENT CAN BE MADE IN 196 DAYS FROM RECEIPT OF ORDER	We quote you as above subject to the Terms and Conditions on the reverse.
FOB: Destination	
TERMS: see attached proposal	
SIGNATURE: <i>David Morris</i>	
PRINT NAME AND TITLE: DAVID MORRIS President	
PHONE NUMBER: 508-670-1113	

REQUEST FOR PROPOSAL
THIS IS NOT AN ORDER

RUTGERS — THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
P.O. BOX 6999
PISCATAWAY, NJ 08855-6999

THE R.F.P. NUMBER MUST APPEAR ON ALL
CORRESPONDENCE REGARDING THIS
PROPOSAL.

R.F.P. 7-04-08-2

RETURN SIGNED PROPOSAL IN A SEALED ENVELOPE. SHOW
R.F.P. # ON OUTSIDE OF ENVELOPE.

IN EVENT OF THIS PROPOSAL BEING ACCEPTED, A PURCHASE
ORDER WILL BE SENT.

3. SEE REVERSE SIDE FOR TERMS & CONDITIONS.

TI Qualitek
Attn: David Norris
340-Fordham Road-
Wilmington, MA 01887

**WE HAVE
MOVED**

PLEASE MAKE A
NOTE OF OUR
NEW ADDRESS,
PHONE AND FAX

**ITI
QUALITEK**

267 Boston Road
Billerica, MA 01862-2310
tel 508-670-1113
fax 508-670-1114

4. ANY EXPENSE INCURRED BY THE BIDDER IN CONNECTION
WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE
BIDDER.

5. IF PROPOSAL IS NOT F.O.B. DESTINATION, YOU MUST SHOW
COST OF FREIGHT AS A SEPARATE ITEM.

DATE 8/97	THIS R.F.P. WILL BE OPENED: May 2, 1997	2:00 PM	BY
PLEASE QUOTE THE FOLLOWING F.O.B. DESTINATION			DIRECTOR OF PURCHASES

THIS (ORIGINAL LEGAL SIZE SHEET) REQUEST FOR PROPOSAL FORM "MUST" BE SIGNED AT THE BOTTOM AND RETURNED WITH THE BID SHEET(S). YOUR
ENTIRE BID WILL BE REJECTED AND DISQUALIFIED IF THIS FORM IS "NOT" SIGNED AND RETURNED ON OR BEFORE THE BID DUE DATE AND TIME.
FURTHERMORE BIDDERS WHO WISH TO REMAIN ON OUR "QUALIFIED" BIDDERS LIST SHOULD ALSO SIGN AND RETURN THIS BID FORM
INDICATING REASON(S) FOR NOT SUBMITTING BIDS OR PROPOSALS.

PROPOSALS SHOULD BE RETURNED IN THE ENCLOSED YELLOW ENVELOPE OR ATTACH THE YELLOW ENVELOPE TO THE OUTSIDE OF A LARGE ENVELOPE, IF
NECESSARY. TELEGRAPHIC AND FACSIMILE PROPOSALS ARE NOT ACCEPTABLE. BIDDERS MUST SUBMIT SEALED BIDS ONLY. ANY COMMUNICATION (SUCH
AS FACSIMILE TRANSMITTAL), WHICH REVEALS THE CONTENTS OF A SEALED PROPOSAL WILL RESULT IN DISQUALIFICATION OF THE ENTIRE PROPOSAL.

IT IS THE BIDDERS RESPONSIBILITY TO SEE THAT THEIR PROPOSAL ARRIVES AT THE UNIVERSITY PROCUREMENT & CONTRACTING OFFICE BEFORE THE
PROPOSAL OPENING DATE AND TIME.

9. PROPOSALS DELIVERED IN PERSON OR BY EXPRESS SERVICE SHOULD BE TO OUR ACTUAL LOCATION.

THIS LOCATION IS: RUTGERS-THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
ADMIN. SERVICES ANNEX BLDG. 1 RM. 101
DAVIDSON ROAD/BUSCH CAMPUS
P.O. BOX 6999
PISCATAWAY, NEW JERSEY 08855-6999

10. ALL CASH TERMS WILL BE ACCEPTABLE, HOWEVER, TERMS LESS THAN 3%-30 DAYS WILL NOT BE CONSIDERED IN THE BID AWARD.

ANY ADDENDUMS TO THIS REQUEST FOR PROPOSAL MUST BE ACKNOWLEDGED BY SIGNATURE BELOW. FAILURE TO COMPLY WILL RESULT IN REJECTION
OF PROPOSAL.

YOU MUST SIGN BELOW FOR EACH ADDENDUM RECEIVED.

ADDENDUM: #1 _____ (Signature)
#2 _____ (Signature)
#3 _____ (Signature)

12. BIDDERS MUST COMPLY WITH ALL PROPOSAL ENCLOSURES AND MUST RETURN CERTAIN ENCLOSURES WITH PROPOSAL FORM. PHOTOCOPIES OF ANY REQUIRED
ENCLOSURES ARE NOT VALID. THOSE INDICATED MUST HAVE ORIGINAL SIGNATURES AND NOTARY SEAL. FAILURE TO COMPLY WILL RESULT IN
REJECTION OF PROPOSAL.

THEY ARE: (1) N.J. PL 1977 C.33 (MUST BE SIGNED AND RETURNED)
(2) NON-COLLUSION STATEMENT NCS-1 (MUST BE NOTARIZED)
(3) AFFIDAVIT (MUST BE NOTARIZED)

13. A. REQUIREMENT TO BE PROVIDED BY SUCCESSFUL BIDDER AFTER PROPOSAL AWARD IS MADE.

(1) PL 1975 C.127 WITHIN SEVEN (7) DAYS AFTER RECEIPT OF PURCHASE ORDER.

NOTE: "IF AWARDED CONTRACT YOUR COMPANY/FIRM WILL BE REQUIRED TO COMPLY WITH THE REQUIREMENTS OF PL 1975 C.127. (NJAC17:27)"

(2) INSURANCE, AFTER AWARD AND PRIOR TO START OF WORK.

B. SUPPLEMENTAL TERMS & CONDITIONS, FORM STC-1 IS A NOTICE OF REQUIREMENT FOR COMPLIANCE BY BIDDER TO WHOM AN AWARD IS MADE AND
IS TO BE RETAINED BY BIDDER.

ADDITIONAL ENCLOSURES ARE: DID YOU SHEET/SPECIFICATIONS

ALL PROPOSALS SUBMITTED TO RUTGERS UNIVERSITY, PROCUREMENT & CONTRACTING WILL BECOME PUBLIC INFORMATION AS OF THE PROPOSAL OPENING
DATE AND TIME.

15. NOTE PERMITS - SEE ATTACHMENT PL1. - ATTACHED _____ NOT APPLICABLE X

REFER ALL QUESTIONS REGARDING THIS REQUEST TO: MICHAEL DUNN/H/(908)445-5070	NOTE: SHOW ALL TAXES AS SEPARATE ITEM	GRAND TOTAL → \$454,600
--	---------------------------------------	-------------------------

THIS SPACE TO BE FILLED IN BY BIDDER

SHIPMENT CAN BE MADE IN 196 DAYS FROM RECEIPT OF ORDER	We quote you as above subject to the Terms and Conditions on the reverse.
FOB Destination	
TERMS: See attached proposal	
SIGNATURE: <i>David Morris</i>	
PRINT NAME AND TITLE: DAVID MORRIS PRESIDENT	
PHONE NUMBER: 508-670-1113	

AFFIDAVIT

TO: Rutgers-The State University of New Jersey

The undersigned is a contractor bidding on the contract for "MRE Pouch" Leak Tester on the Campus of Rutgers-The State University of New Jersey.

I hereby certify that:

(1) Each and every workman employed by it on the work under this contract will be paid an hourly wage of not less than the prevailing rate of wages established by the Commissioner of Labor and the State of New Jersey.

(2) An accurate record showing the name, craft, or trade, an actual hourly rate of wages paid to each workman employed in connection with this project will be kept by it throughout the construction period of this project. These records will be preserved for a period of three (3) years from the date of completion of the contract. These records will be open at all reasonable hours to inspection by authorized officers and employees of Rutgers-The State University of New Jersey and to the Commissioner of Labor and Industry of New Jersey or his authorized agents.

(3) No employee or applicant will be discriminated against because of race, creed, color, religion, national origin, ancestry, ages, sex, or liability for military service.

(4) The neuter gender when used herein shall include all persons and corporations and words used in the singular shall include words in the plural where the text of the instrument so requires.

THIS ENCLOSURE MUST BE COMPLETED, SIGNED, NOTARIZED AND RETURNED WITH THE BID OR YOUR BID WILL BE INVALID.

PC/AF - Revised 3/95

State of New Jersey)) SS
County of _____)

IN WITNESS WHEREOF, the said parties have hereunto set their hands or caused these presents to be signed by their proper corporate officers and caused their proper corporate seal to be hereto affixed, the 30th day of April, 1997.

ITI Qualitek
A Division of Ion Track Instruments, Inc.
(Name of Corporation)

(Business Address)

Julianne Bonady
(Notary Public)
Commonwealth of Mass.

My Commission Expires: January 16, 1998

NEW JERSEY PUBLIC LAW 1977 C33

THIS ENCLOSURE MUST BE COMPLETED, SIGNED, AND RETURNED WITH THE PROPOSAL OR YOUR PROPOSAL WILL BE INVALID.

Pursuant to N.J.P.L. 1977, Chapter 33, the vendor must provide a complete list of names and address of all persons who fall into any of the following categories.

(If additional space is required, use separate sheet and attach)

1. If a Vendor is a Corporation, Vendor hereby certifies that the following is a complete list of the names of stockholders who own 10% or more of its stock, of any class:

NAMES

ADDRESSES

T.G. Group, Inc.

4 Constitution Way

100%

Woburn, MA 01801

NAME OF CORPORATION ITI Qualitek - A Division of Ion track Instruments, Inc.

BY David Morris

DATE 4/30/97

AUTHORIZED REPRESENTATIVE (PRINT)

SIGNATURE

2. If the Vendor is a Partnership, Vendor hereby certifies that the following is a list of all partners in Vendor who own 10% or greater interest in the assets, profit, or cash flow of Vendor:

NAMES

ADDRESSES

NAME OF PARTNERSHIP

BY

DATE

AUTHORIZED REPRESENTATIVE (PRINT)

SIGNATURE

If Vendor is either a Partnership or a Corporation, and one or more stockholder or partner is itself a Corporation or Partnership, the Vendor must list the stockholders holding 10% or more of that corporation or the individual partners owning a 10% or greater interest in that partnership, as the case may be.

NAMES

ADDRESSES

(STOCK/INTEREST IN)
NAME OF CORPORATION/PARTNERSHIP

SUBMITTED BY:

NAME OF FIRM

BY

DATE

AUTHORIZED REPRESENTATIVE (PRINT)

SIGNATURE

4. If Vendor has previously provided Rutgers-The State University with the information required by N.J.P.L. 1977 C33 on this form, and there has been no change of ownership of Vendor since such information was provided, or the vendor is a sole proprietorship, the foregoing is not required, but **THE VENDOR MUST SIGN BELOW FOR CERTIFICATION:**

Purchase order or RFQ number _____ Date: _____ (If Applicable)

NAME OF FIRM

BY

DATE

AUTHORIZED REPRESENTATIVE (PRINT)

SIGNATURE

Above information must be returned to: RUTGERS-THE STATE UNIVERSITY
University Procurement & Contracting
P.O. Box 6999
Piscataway, N.J. 08855-6999

THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS

UNIVERSITY PROCUREMENT AND CONTRACTING • PO BOX 6999 • PISCATAWAY NJ • 08855-6999
(908) 445-3000 • FAX (908) 445-4712

NON-COLLUSION STATEMENT

Date April 30, 1997

Rutgers-The State University
University Procurement & Contracting
P.O. Box 6999
Piscataway, N.J. 08855-6999

Dear Supplier:

This is to certify that the undersigned supplier has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competition with this proposal submitted to Rutgers-The State University on the 30 day of April, 1997.

NAME OF INDIVIDUAL OR COMPANY ITI Qualitek
A Division of Ion Track Instruments, Inc.

BY David Morris
(TYPE)

Signature *David Morris*

Witness: *Stanley Riccardi*
Signature
Sales Manager
Title

Sworn to and subscribed before me this 30th day of April, 1997.

My Commission Expires January 16, 1998.
(Seal)

Johanne Bonaldi
Notary Public
Commonwealth of Mass.

THIS STATEMENT MUST BE COMPLETED, SIGNED, NOTARIZED AND RETURNED WITH PROPOSAL OR YOUR PROPOSAL WILL BE INVALID.

ACORD

CERTIFICATE OF INSURANCE

DATE (MM/DD/YY)

4/25/97

PRODUCER

Sedgwick of New England, Inc.
40 Broad Street
Boston, MA 02109-4397
617-357-6600

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

COMPANY

A Employers Ins Co Of Wausau

COMPANY

B Hartford Indemnity

COMPANY

C

COMPANY

D

INSURED

ITI QUALITEK, A DIVISION
OF ION TRACK INSTRUMENTS
267 BOSTON ROAD
BILLERICA MA 01862-2310

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS
A	GENERAL LIABILITY	052800101618	1/31/97	1/31/98	GENERAL AGGREGATE \$ 1000000
	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG \$ 1000000
	<input type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR				PERSONAL & ADV INJURY \$ 1000000
	OWNER'S & CONT PROT				EACH OCCURRENCE \$ 1000000
					FIRE DAMAGE (Any one fire) \$ 50000
					MED EXP (Any one person) \$ 5000
B	AUTOMOBILE LIABILITY	MCP399882	2/01/97	2/01/98	COMBINED SINGLE LIMIT \$ 1000000
	ANY AUTO				BODILY INJURY (Per person) \$
	ALL OWNED AUTOS				BODILY INJURY (Per accident) \$
	<input checked="" type="checkbox"/> SCHEDULED AUTOS				PROPERTY DAMAGE \$
	<input checked="" type="checkbox"/> HIRED AUTOS				AUTO ONLY - EA ACCIDENT \$
	<input checked="" type="checkbox"/> NON-OWNED AUTO				OTHER THAN AUTO ONLY: \$
					EACH ACCIDENT \$
					AGGREGATE \$
	GARAGE LIABILITY				EACH OCCURRENCE \$
	ANY AUTO				AGGREGATE \$
	EXCESS LIABILITY				
	UMBRELLA FORM				
	OTHER THAN UMBRELLA FORM				
B	WORKMAN'S COMPENSATION AND EMPLOYERS LIABILITY	08WBCB4282	2/01/97	2/01/98	<input checked="" type="checkbox"/> STATUTORY LIMITS \$
	THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: <input checked="" type="checkbox"/> INCL <input type="checkbox"/> EXCL				EACH ACCIDENT \$ 500000
	OTHER				DISEASE - POLICY LIMIT \$ 500000
					DISEASE - EACH EMPLOYEE \$ 500000

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

RUTGERS IS ADDITIONAL INSURED. CONTRACTOR AGREES TO HOLD HARMLESS & INDEMNIFY RUTGERS FOR CLAIMS, DEMANDS, SUITS BY ANY PERSONS & AGAINST RELATED DAMAGES, LIABILITIES, COSTS & EXPENSES (INCL. ATTY. FEES)

CERTIFICATE HOLDER

CANCELLATION

RUTGERS STATE UNIV. OF NJ
UNIVERSITY PROCUREMENT & CONTR
P O BOX 6999
PISCATAWAY NJ 08855-6999

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT BUT FAILURE TO MAIL SUCH NOTICE SHALL NOT BE A WAIVER OF LIABILITY OF ANY KIND UPON THE COMPANY FOR SUCH CANCELLATION.

AUTHORIZED REPRESENTATIVE

John D. Rie
Sedgwick of New England, Inc.

ITI QUALITEK

267 Boston Road
Billerica
Massachusetts
01862-2310
USA
telephone
508-670-1113
fax
508-670-1114

April 30, 1997

R.F.P. Number: 7-04-08-2

Mr. Michael Dunn
Rutgers-The State University of New Jersey
University Procurement and Contracting
Admin. Services Annex Bldg. I RM. 101
Davidson Road/Busch Campus
P.O. Box 6999
Piscataway, New Jersey 08855-6999

Dear Mr. Dunn:

We want to thank Rutgers State University for allowing ITI Qualitek consideration to bid on R.F.P. Number 7-04-08-2 for a "Leak Tester For Production Line MRE Pouches"

ITI Qualitek has been in the Leak Detection industry for over twenty years servicing the Automotive, Appliance, Aerospace, Medical Device, Pharmaceutical, Food Processing and General Industries. We are part of a group of leak detection companies which includes AI Qualitek LTD in the UK and Meltron Qualitek GMBH in Germany. In response to R.F.P. Number 7-04-08-2 for an on-line Leak Detection System for MRE Pouches we propose the following system:

Systems Proposal:

The system is defined as a multi-station (twenty-four (24) test head) leak tester for testing MRE pouches described as:

3.1 MRE Pouches. Meal, Ready to Eat pouch comply with MIL-P-44073, Primary 8 OZ type. Pouches are filled with retorted food products such as; beef stew, chicken and rice, ham slice. Pouches contain 0-10cc residual air and inspected at 85 degree F @ +/- 15 degree F.

3.2 Cartons. Carton complies with MIL-P-44073. Finished cartons contain one MRE pouch and measure: 4.75" X 0.625" X 8.125".

The leak tester will accept pouches boxed and will look to be detecting leaks (define as gross) in the range of 300 Micron (.012") or greater. Note: Detection capabilities maybe masked by liquid contests in MRE Pouch. Studies have been defined by

Rutgers-State University on the probability of masking. The leak tester will utilize a multiple head load cell system within a vacuum chamber for monitoring the package deflection (load force). Packages that do not leak will exert a certain set level of force measurement. Packages with holes will show lower levels of force. Detection capabilities will allow for setup to detect gross leaks, and a decay mode for detecting finer leaks. Note: masking of hole may occur, probability of masking to be determined by Rutgers University research.

1.0 FUNCTION DESCRIPTION

Cartoning machine will supply MRE pouches to discharge conveyor of an existing cartoning machine. Design accommodations for discharge to leak tester to be flexible. Flexible handling system will load pouches into an accumulator station. Pouches will then be positioned into leak test area. Chamber area will then be sealed creating a sealed vacuum chamber. Using a self contained vacuum system with a reservoir for quick evacuation, vacuum will be drawn to 28 in Hg (13.7 psi). Leaks will be detected by measurement of force on the load cells (gross and decay settings) will be made adjustable for required hole size detection levels. The leak test system will identify good and bad product and upon evacuation of the chamber products will be positioned accordingly (bad product into reject tote area and good product will be placed on a discharge conveyer for the next operation). Bypass area will be made available.

2.0 PERFORMANCE REQUIREMENTS

2.1 Operational Duty: The system will perform at a minimum operating efficiency of 98% continuously at the specified rate of 100 pouches/min. Note: efficiency does not include general maintenance schedule.

2.2 Leak Detection Accuracy: The ITI leak test system will perform to the equivalent accuracy as the Rutgers laboratory unit (ATC-3). Data is contained in Table "1". It is also noted that test data from the ITI Qualipak's 171 single head tester should be made available for review before order acceptance.

2.3 Production Rate: Automatic leak tester shall perform at a minimum of 100 pouches per minute.

2.4 Operation. The Package Leak Tester is automatic and will perform its operation without operator assistance.

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R.F.P. Number 7-04-08-2

3.0 PACKAGE INFORMATION (supplied by customer)

3.1 MRE pouches: Pouches supplied by the customer are a meal, ready to eat pouch and comply with MIL-P-44073, primary 8oz type. Pouches are filled with retorted food products such as; beef stew, chicken and rice, ham slice. Pouches contain 0-10cc residual air and inspected at 85degree F @ +/- 15 degree F.

3.2 Cartons: Corrugated container (carton) complies with MIL-P-44073. Finished cartons contain one MRE pouch and measure: 4.75" X 0.625" X 8.125".

4.0 DESIGN REQUIREMENTS

4.1 Material Handling

4.1.1 General: Pouches and cartons will be handled and tested without damage. Transfer mechanism will be designed to minimize carton jams and will also be easily cleared if a jam occurs.

4.1.2 Leak Tester Infeed: ITI Qualitek will receive pouches from a discharge conveyer. Conveyer specifications are not available at this time but design criteria should be made available to ITI Qualitek so accumulation area can be design accordingly. Note: It is assumed conveyer design will be a 10" wide table top chain conveyor 12' long and 34" high.

4.1.3 Leak Test Discharge Conveyer: Discharge conveyer will be part of the leak test system. Discharge conveyer will extend 12' beyond the leak tester. Pouches that pass the leak tester will go onto the discharge conveyer.

4.1.4 Reject Bin: Samples rejected will be ejected into a reject bin or tote.

4.2 CONTROLS

4.2.1 Control Panel: The leak tester will be operated from a main control panel. The tester will be supplied with the appropriate safety switches and activation switches for start up. The tester will be controlled via an industrial PC running virtual instrument software under Windows. The IPC will have a touch screen display and be mounted to a IP65 enclosure. Test data (pass/fail/total tested) information documentation via the PC. Handling system and sorting will be controlled via a PLC which will receive pass/fail signals from the PC.

4.2.2 Operating Modes:

4.2.2.1 Run Mode: The normal run mode will be considered full operation. The leak tester will be accepting pouches at the specified rate. Testing and sorting (pass/fail) will be performed in this mode of operation.

4.2.2.2 Jog Mode: System will have a jog mode which will allow one complete test cycle in a manual type mode.

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R.F.P. Number 7-04-08-2

4.2.2.3 Program Mode: The leak tester will have the ability to make the adjustments in test set-up parameters. This mode of operation will be called the program mode. Adjustments for setting the pass/fail parameters, vacuum levels, test and stabilization time.

4.2.3 INFORMATION DISPLAY

Machine status will be indicated on the control panel. Green will indicate machine is in the production mode. Red will indicate idle or not in operation. An emergency stop will be made available. Control panel will indicate amount tested, pass/fail totals, vacuum level and fault vacuum settings, cycle time (stab and test), and package jam

4.2.4 PRINTER

A inkjet printer will be provided with the system. Tester information will include date/time tested, batch and line number, pass or fail indication, force reading maximum and decay force and total production output. Printer results will also include time start-up and stop system and system fault (error).

4.3 TEST METHOD

Test method will be a vacuum chamber with multi-test heads using force (load cell) measurement to determine product criteria (pass/fail). Note : test method is same as single head Qualipak 171 leak tester currently on site at Rutgers.

4.4 VACUUM SYSTEM

4.4.1 Leak test system includes all piping, valves, accumulator and vacuum pump to meet test criteria for 100 pouches/min. Vacuum system to be specified before final design review.

4.4.2 Vacuum settings within the chamber will have a error set point. If test vacuum level is not obtained or goes below a set level a fault vacuum single will be signaled.

4.4.3 Vacuum level of 28 inches Hg (13.7 psi) will be obtainable with specified vacuum system.

4.4.4 An accumulator will be designed for pulling a vacuum of 28 inches of Hg in 1.0 seconds. Note: vacuum evacuation time is approximate.

4.5 CONSTRUCTION

Leak test system will be constructed of stainless or anodized aluminum. For portability leak tester will be mounted on rollable castors.

4.6 ELECTRICAL

System will meet NEMA 4 or better requirements. The machine will be wired for 120 or 208 volts. A main electrical disconnect will be supplied.

4.2 PNEUMATICS

Pneumatic requirements will be specified by ITI Qualitek. Requirements will not exceed 100 psi.

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R.F.P. Number 7-04-08-2

4.7 SYSTEM DIMENSIONS

System dimensions will not exceed 10' X 10'. Systems dimensions will be reviewed during design review.

4.8 CLEANABILITY

Machine will be designed for easy cleaning. Maintenance will be reviewed during design review.

4.9 SAFETY

All ITI Qualitek systems are designed with safety as the number one priority. Equipment will have the proper guarding, safety interlocks and emergency stop buttons.

5.0 GENERAL

5.1 COST

Price for the above system is \$ 454, 600

Note: price above is F.O.B. Rutgers University

5.2 DELIVERY SCHEDULE

Delivery of system is twenty-eight (28) weeks ARO. ITI Qualitek deliveries are estimated to the best of our ability we do not except any penalty clause in regards to late delivery.

5.3 SERVICE

On site service will be provided for one full year as per the contract. After the warranty period service will be provided at normal service rates.

5.4 MANUALS

A full set of documentation manuals are provided with the system. They include operational, maintenance and control manuals. Any software used on the system will be provided on a floppy disk.

5.5 DRAWINGS AND PHOTOS

Drawings and schematics of systems maintenance area's will be supplied with the system. Layout drawing will be provided on Auto cad 13 with full documentation showing plan and elevation views. Any additional drawings will be discussed and provided as needed. Photo will be supplied of system.

5.6 N/A

5.7 N/A

5.8 LIMITED WARRANTY

Warranty is for 12 months after installation. See attached ITI Qualitek terms and conditions referring to limited warranty.

Page 6.
R.F.P. Number 7-04-08-2

6.0 ACCEPTANCE

6.1 Preliminary Acceptance Test: Upon completion of the test system a performance test will be run at ITI Qualitek.. Number of samples to be run and tests longevity to be discussed and finalized before order acceptance.

6.2 Final Acceptance Test: A final acceptance test will be run at the designated production site. Test system will run pouches for one hour at 100 pouches/min and meet the required accuracy. Note: Accuracy of hole detection to be finalized before order acceptance.

7.0 SHIPPING AND INSTALLATION

7.1 The shipment will be F.O.B., Rutgers University, Food Manufacturing Technology Facility, 120 New England Ave, Piscataway, NJ 08902 or to designated production area's. Possible other sites are Evansville, IN, Cincinnati, OH or Mullins, SC.


7.2 ITI Qualitek will install and run final acceptance test. After acceptance full maintainance and operator training will be provided. We approximate training to be two (2) weeks.

PAYMENT TERMS:

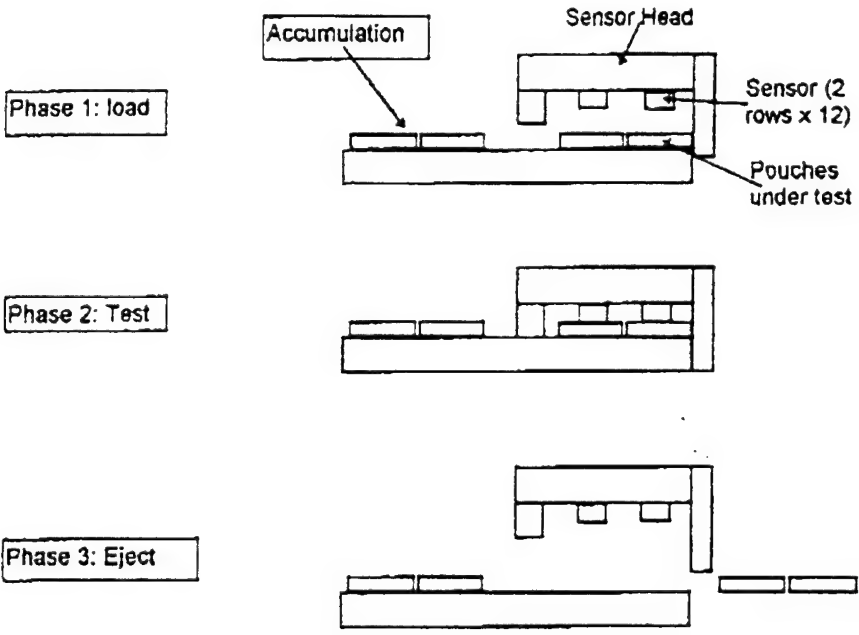
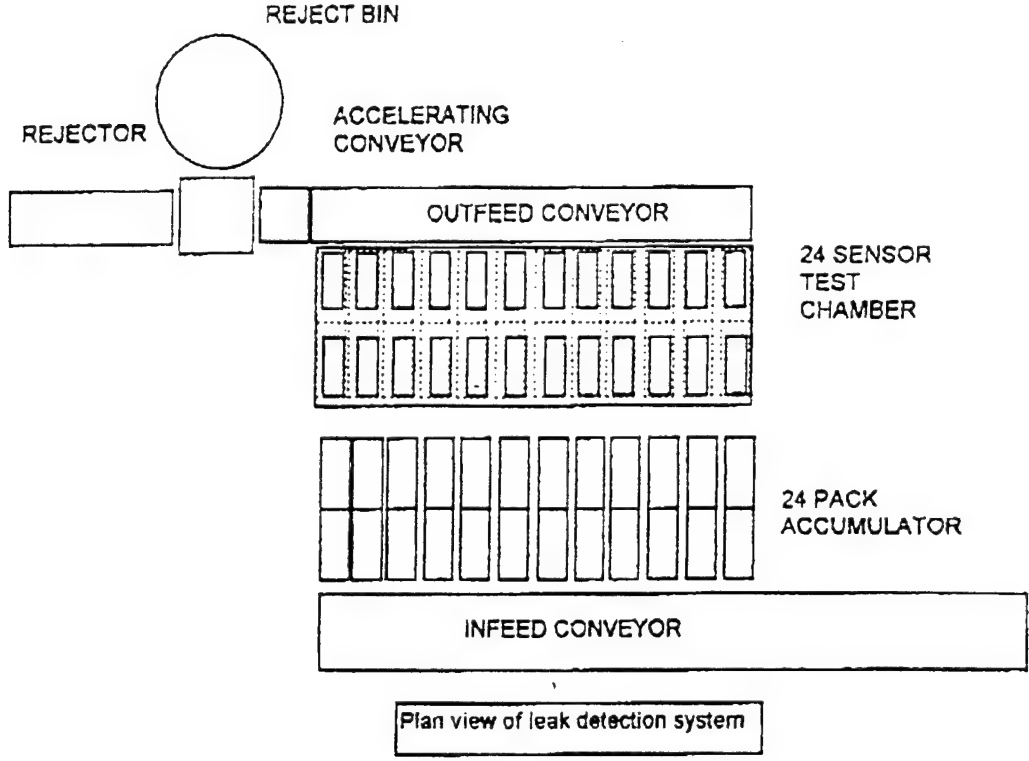
30% UPON ACCEPTANCE OF ORDER
30% AFTER DESIGN APPROVAL
30% AFTER FINAL ACCEPTANCE AT ITI QUALITEK
10% NET 30 DAYS AFTER DELIVERY TO SITE

We have attached a concept sketch of the system being offered and a graph depicting a typical operation mode of a vacuum system with load cell. Again ITI Qualitek wants to thank the Rutger University for the opportunity to provide this system quotation. If there are any questions please feel free to call me or Dave Morris (President) at 508/670-1113 at anytime.

Sincerely,

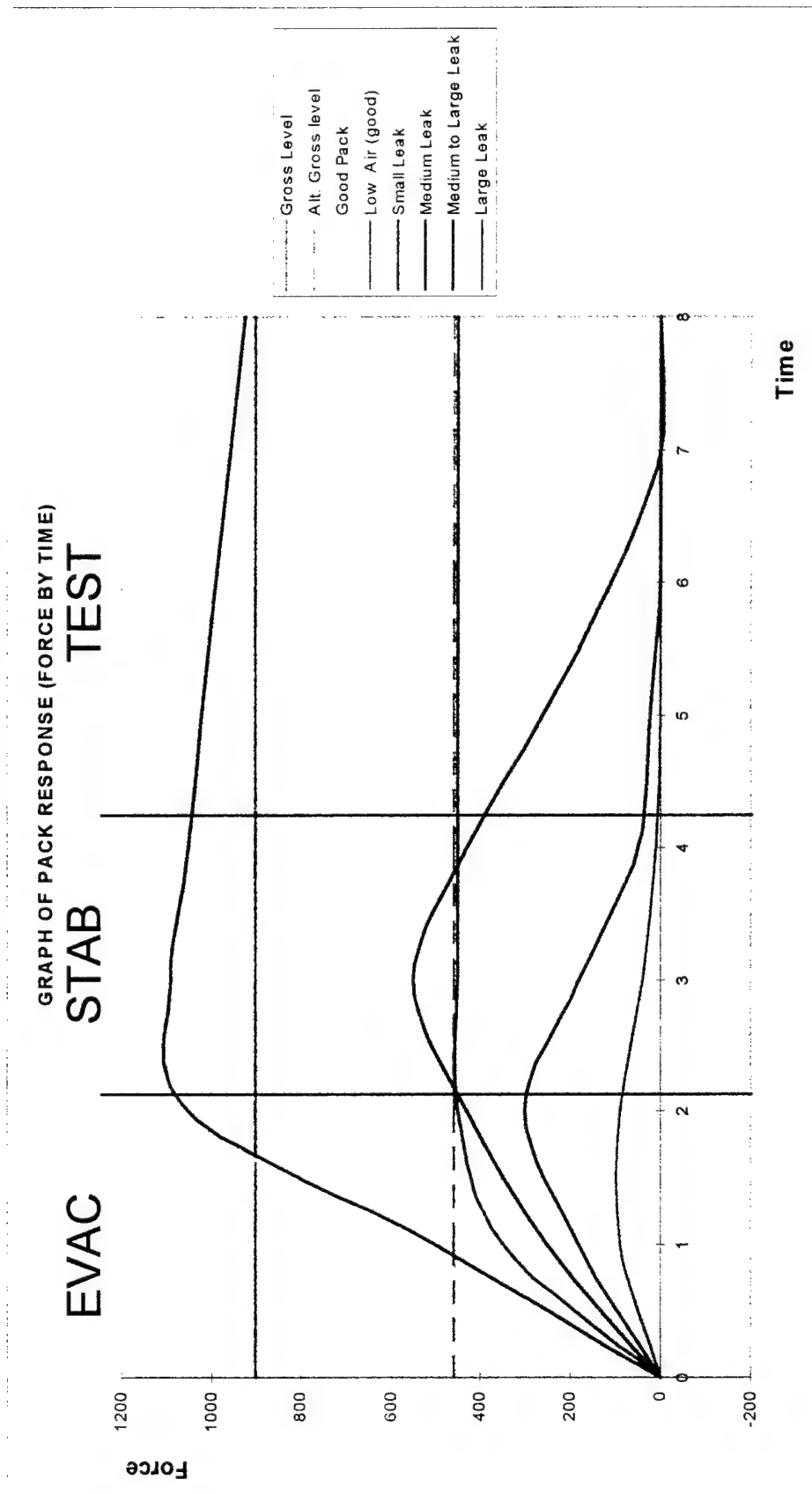


Stanley Riccardi
Sales Manager



Concept Sketch

Operation - Vacuum mode



QUALI PAK
LEAK DETECTION

ITI QUALITEK 267 Boston Road N. Billerica, MA 01862 (508) 670-1113

TERMS AND CONDITIONS

ACCEPTANCE: ITI Qualitek ("ITI") offers for sale the items of equipment listed on the face hereof ("Items") on the express condition that the purchaser named on the face hereof ("Purchaser") agrees to accept and be bound by all the terms and conditions set forth herein. Acceptance by the Purchaser shall be evidenced by any of the following: (a) written, telephonic or telegraphic acceptance received by ITI within 30 days from the date hereof (including receipt of Purchaser's purchase order form); or (b) shipment by ITI and acceptance of delivery by Purchaser of or payment for all or any of the items.

AGREEMENT: The agreement between ITI and Purchaser ("Sales Contract"), with respect to the items shall consist of the terms and conditions contained herein together with any additions to or revisions agreed to in writing by ITI and Purchaser. ITI shall not be bound by, and hereby objects to and rejects, any additional or different terms, whether printed or otherwise, in Purchaser's purchase order or in any communication between Purchaser and ITI, unless specifically agreed to by ITI in writing. Prior courses of dealing, usages of the trade, and verbal agreements shall not be binding on ITI, and ITI hereby objects to and rejects any additional or different terms, not so agreed to in writing.

TERMS: Net 30 days from invoice date subject to the approval at the time of shipment. Payments will be due on partial deliveries to Purchaser.

DELIVERY: ITI will make reasonable efforts to effect shipment on or before the estimated delivery dates set forth on ITI's quotation and acknowledgement. ITI shall not be liable for delays in shipment or delivery.

SHIPMENT: All prices are F.O.B. place of shipment. In the absence of specific instructions, ITI will package and ship by the most appropriate method, in its sole discretion.

TITLE: Title to all items shall pass from ITI to Purchaser at the place and time of shipment. If Purchaser should fail to pay any amount due to ITI hereunder, ITI shall have, in addition to any other rights, the right to repossess such items. In addition, until Purchaser has paid such amount due to ITI, ITI shall retain a security interest in such items in the amount of the full purchase price, and shall retain all rights and remedies of a secured party under the Uniform Commercial Code. A copy of ITI's invoice may be filed with the appropriate authorities as a financing statement or chattel mortgage to perfect ITI's security interest. Upon the request of ITI, Purchaser will execute financing statements and other documents for ITI to perfect its security interest.

INSPECTION BY PURCHASER: Purchaser shall inspect all deliveries upon receipt and report to ITI within 5 working days of the date of delivery any alleged error, shortage, defect or non-conformity. Failure by Purchaser so to inspect and report shall constitute a waiver of any claim or right of Purchaser against ITI arising from any error, shortage, defect or non-conformity reasonably discoverable by such an inspection.

INSURANCE: The risk of loss, damage to or destruction of the items shall be assumed by the Purchaser upon passage of title to Purchaser. Transportation and insurance costs shall be paid by the Purchaser. Claims for damage, loss or delays in transit shall be against the carrier, and ITI shall have no responsibility or obligations thereof.

CANCELLATION CHARGE: Purchaser is subject to a cancellation charge of 15% of the total Sales Contract price for orders cancelled at no fault of ITI. In addition, Purchaser shall pay ITI the full amount of any quantity discount obtained by Purchaser with respect to other items of equipment which was attributable to the items included in the cancelled order.

LIMITED WARRANTY: ITI warrants that the items will be free from defects in material and workmanship for a period of twelve (12) months from date of shipment. ITI will repair or replace, at its option, items which prove to be defective during this warranty period only if (a) the defective item is returned to ITI, transportation charges prepaid, and (b) examination of the item discloses the defects in the product have not been caused by misuse, neglect, improper installation, repair, alteration, or accident. Items supplied by ITI but manufactured by others, such as TV components, computers, or software, are excluded from ITI's warranty but may be covered by the manufacturer's warranty (if any). Consumable items supplied by ITI are excluded from this warranty, such as filters, membranes, seals, and other identified items.

THE ABOVE WARRANTY IS EXCLUSIVE. ITI MAKES NO OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED. NO IMPLIED WARRANTY OF MERCHANTABILITY, NO IMPLIED WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, AND NO IMPLIED WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OF PERFORMANCE IS GIVEN BY ITI OR SHALL ARISE BY OR IN CONNECTION WITH THIS SALE AND/OR PURCHASER'S AND/OR ITI'S CONDUCT IN RELATION THERETO OR TO EACH OTHER, AND IN NO EVENT SHALL ITI BE LIABLE ON ANY SUCH WARRANTY WITH RESPECT TO ANY ITEMS. IF ANY MODEL OR SAMPLE WAS SHOWN TO PURCHASER, SUCH MODEL OR SAMPLE WAS USED MERELY TO ILLUSTRATE THE ITEMS AND NOT TO REPRESENT THAT ITEMS DELIVERED HEREUNDER WOULD CONFORM TO THE MODEL OR SAMPLE. NO REPRESENTATIVE OF ITI IS AUTHORIZED TO GIVE OR MAKE ANY OTHER REPRESENTATION OR WARRANTY OR MODIFY ITI'S WARRANTY IN ANY WAY.

TAXES: Purchaser shall be responsible for and pay any and all state and local use, sales and similar taxes.

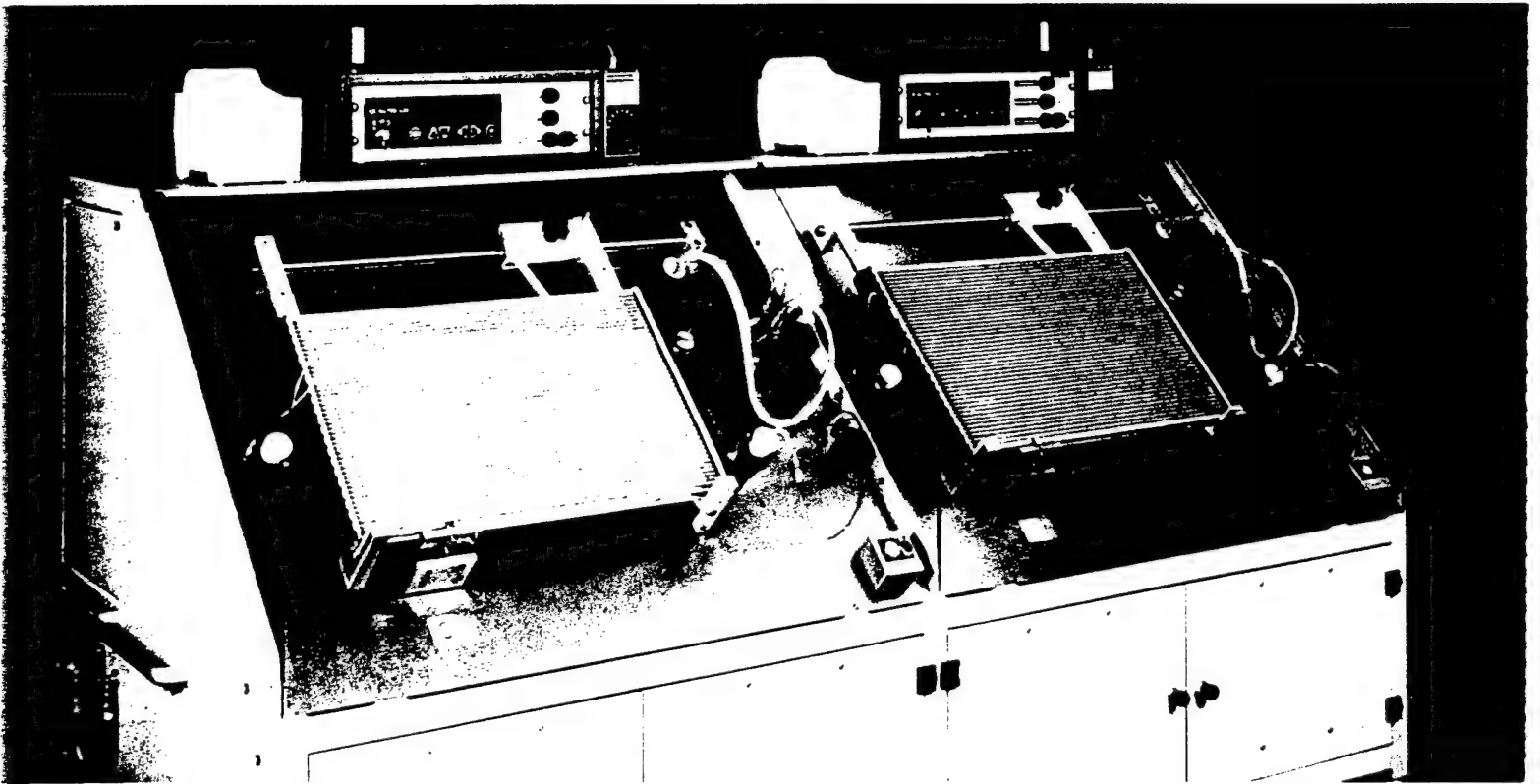
LIMITATION ON LIABILITY: The obligations of ITI and the remedies provided to Purchaser under "WARRANTY" above shall constitute the exclusive liabilities of ITI and remedies of Purchaser under or in connection with the items or the use or transfer thereof. Except as specifically provided therein, ITI shall not be responsible or liable for any costs, expenses or damages.

IN NO EVENT SHALL ITI BE RESPONSIBLE OR LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES ARISING IN ANY WAY IN CONNECTION WITH THIS SALE, EVEN IF ITI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

PURCHASER AGREES TO TAKE NO ACTION, AND NOT ASSIST ANY OTHER PERSON IN TAKING ACTION, THE RESULT OR PURPOSE OF WHICH IS TO DEROGATE IN ANY MANNER ANY PROVISION OF THIS SECTION. PURCHASER FURTHER AGREES TO INDEMNIFY AND HOLD HARMLESS ITI (AND TO DEFEND ITI) FROM ANY AND ALL EXPENSES AND CLAIMS WHICH MAY ARISE FROM OR IN ANY MANNER RELATED TO THE USE, DESIGN, INSTALLATION OR MAINTENANCE OF THE ITEMS.

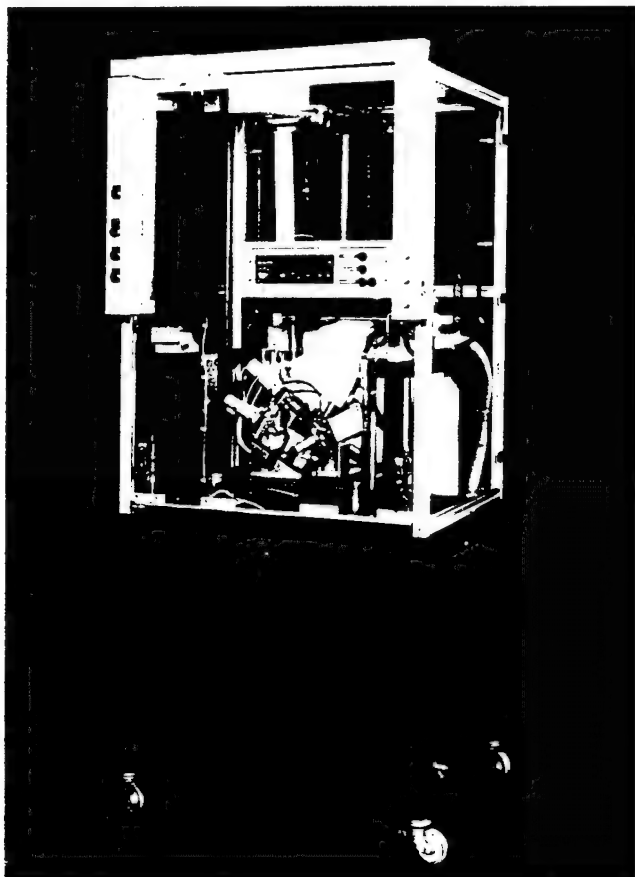
LIMITATION OF ACTION: No action may be brought by either party more than one year after the cause of action arose, or in the case of non-payment, more than two years from the date of last payment.

CONTROLLING LAW: The Sales Contract shall be construed in accordance with the Laws of the Commonwealth of Massachusetts.



Leak Test Systems

- Automotive
- Medical Device
- Appliance
- Testing Components and Assemblies



History

ITI Qualitek has for over 20 years been a leader in the design and manufacture of Quality Instrumentation for Non-Destructive Leak Detection. ITI Qualitek has supplied systems to the Automotive, Medical Device, Pharmaceutical, Food Packaging and Appliance Industries. The emphasis on the design for all instruments (panels) has always been to provide a unit that has flexibility, reliability, sensitivity and repeatability, together with an easy to understand user interface. The Sensor Technology used within the equipment (Qualitek Series) ranges from Air Pressure Decay (both Gauge and Differential), Laminar, Mass Flow, and Force (Strain) measurement. Instruments are manufactured in accordance with BS EN ISO 9001: 1994 certified and approved to CE certification.

Experience

To obtain the maximum benefits from the features offered by using the ITI Qualitek instruments, it is of prime importance that the interface between the tested product and instrument panel be engineered correctly.

At ITI Qualitek, we have a wealth of experience and expertise in the design and build of all types of systems, whatever the complexity. At the very start of each project, we sit down with the customer to determine their requirements in terms of the labor to be used, the throughput required and the product specification.

Comprehensive Proposals

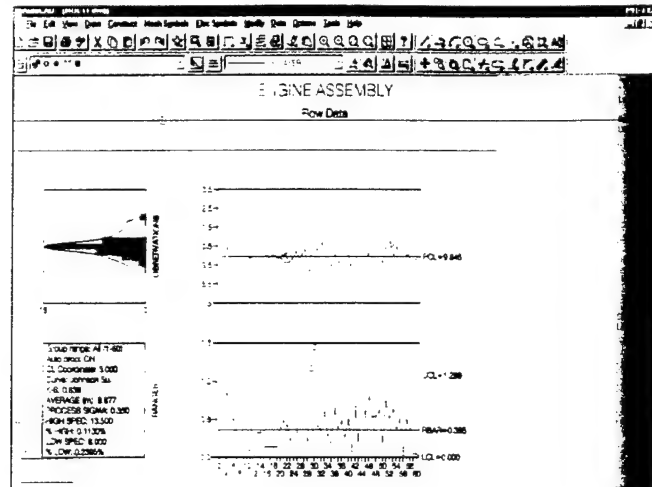
An initial proposal is then drawn up and presented to the customer. All facets of the proposal are considered and discussed at that time, including the materials used to ensure compatibility with the process, the components selected to ensure reliability and long life, and the logic controller used for ease of programming. In addition, the operator safety guarding and interface logic switches are carefully selected. Product marking, either accept witness mark or reject stamp, are typically provided to identify tested components. Sealing and clamping techniques implemented are thoroughly researched to ensure the repeatability of the test, long life and low maintenance of the system.



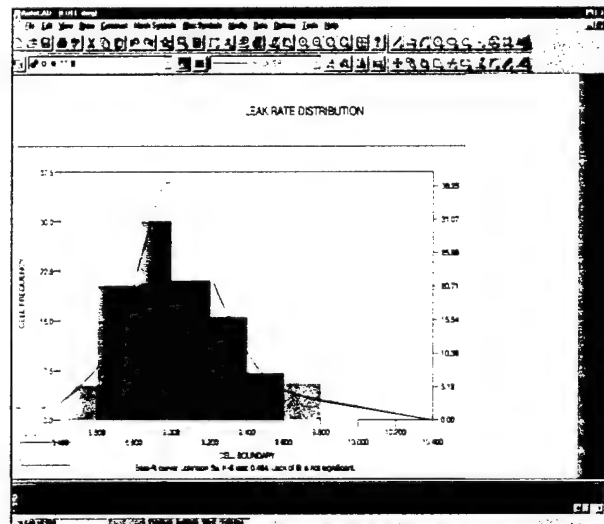
Providing Statistical Quality Control Data

Both product quality and productivity can be improved by analyzing the information generated during a Qualitek test.

Collecting data provides a valuable insight into the manufacturing process and the product, identifying trends which may require action by the operator. The RS232 bi-directional interface port allows fast down loading of test results for analysis and presentation using the Qualitek SQC software. On-line statistical displays for real time monitoring and archiving for further analysis are both available to the engineer.



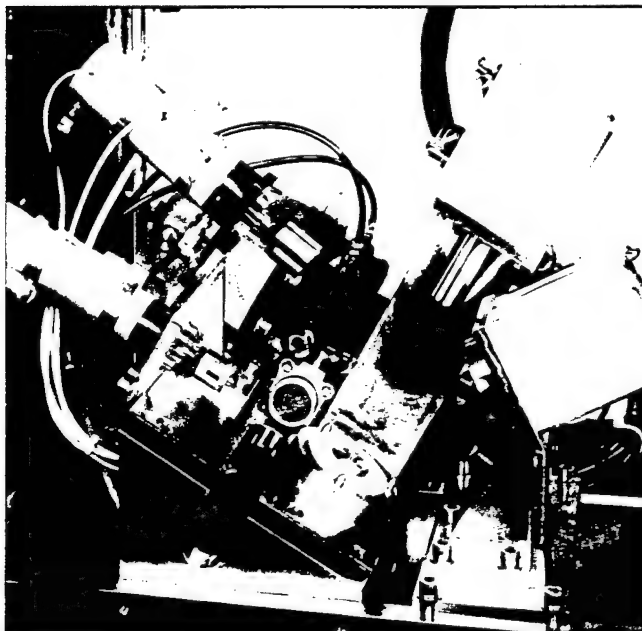
Multi window process analysis



Full screen display

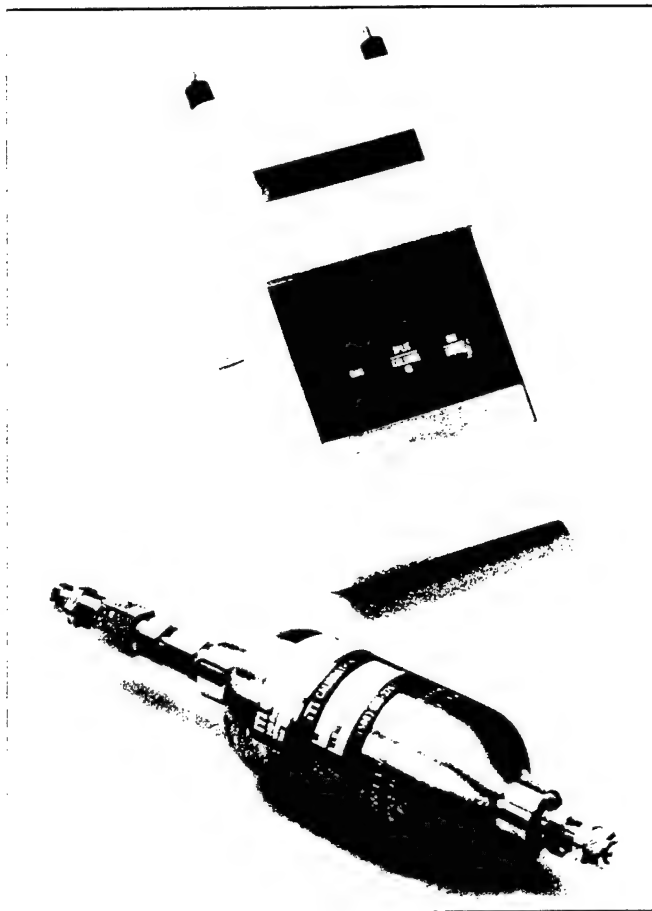
Typical PC Displays

- X Bar and Range Chart
- Process Capability Analysis
- Pareto Diagram



Creative and Proven Engineering Capabilities

ITI Qualitek Systems Engineers are creative and responsible in serving the customer, providing a fast response to inquiries. Our engineers are "Production Proven" in solving problems. Practical knowledge of manufacturing techniques, experience in Leak Detection Technology and a continuous education process enables ITI Qualitek to provide "Turnkey Test Systems" at a highly competitive value - check us out - our guarantee is simple, you will be satisfied with the product supplied.



Customer Acceptance Trials and Calibration

At the time of installation of the system, R&R runs are initiated, i.e. components are loaded to the system and the data recorded for a pre-determined number of consecutive tests for both non-leaking and leaking components. To optimize the system performance, calibrated leaks are manufactured to the customer's specification and traceable to N.I.S.T. are used. ITI Qualitek's rigid and tested equipment acceptance "run off" procedures ensure total customer satisfaction.

ITI QUALITEK

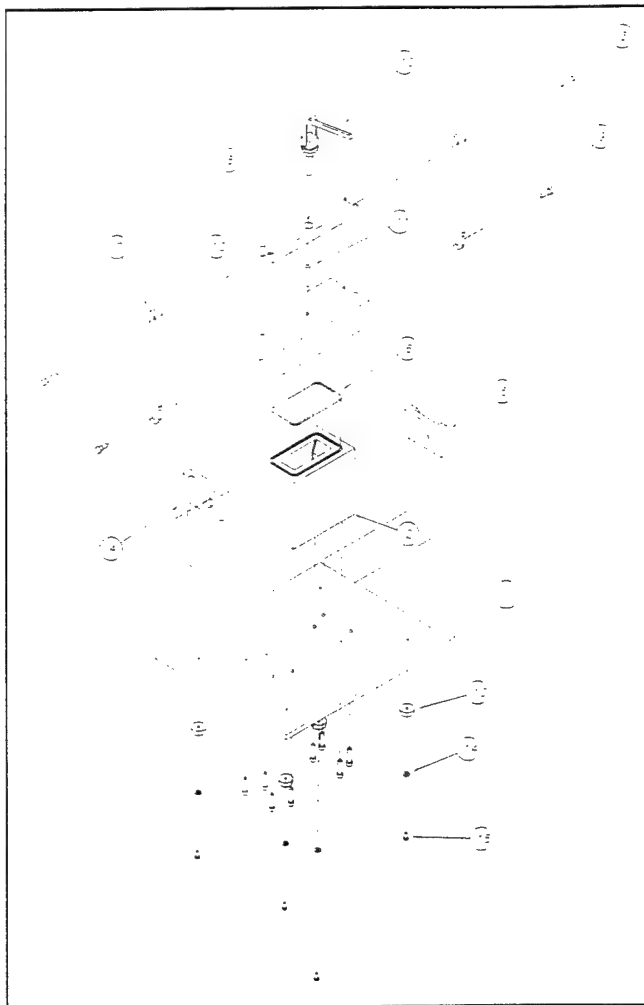
267 BOSTON ROAD
N. BILLERICA
MA 01862-2310, USA

TEL (508) 670 1133
FAX (508) 670 1144

ALSO:
Ai QUALITEK - JAPAN
Meltron QUALITEK - GERMANY

Information Updates and Design Criteria

Through all stages of the design and manufacture, the customer is informed of the progress, and any changes discussed. Documentation is presented with every project, including System Schematics, Logic Operations, Maintenance, Spare Parts Listings and ACAD R.13 Project tape back-up.



Full Documentation Provided with Every Qualitek Leak Test System

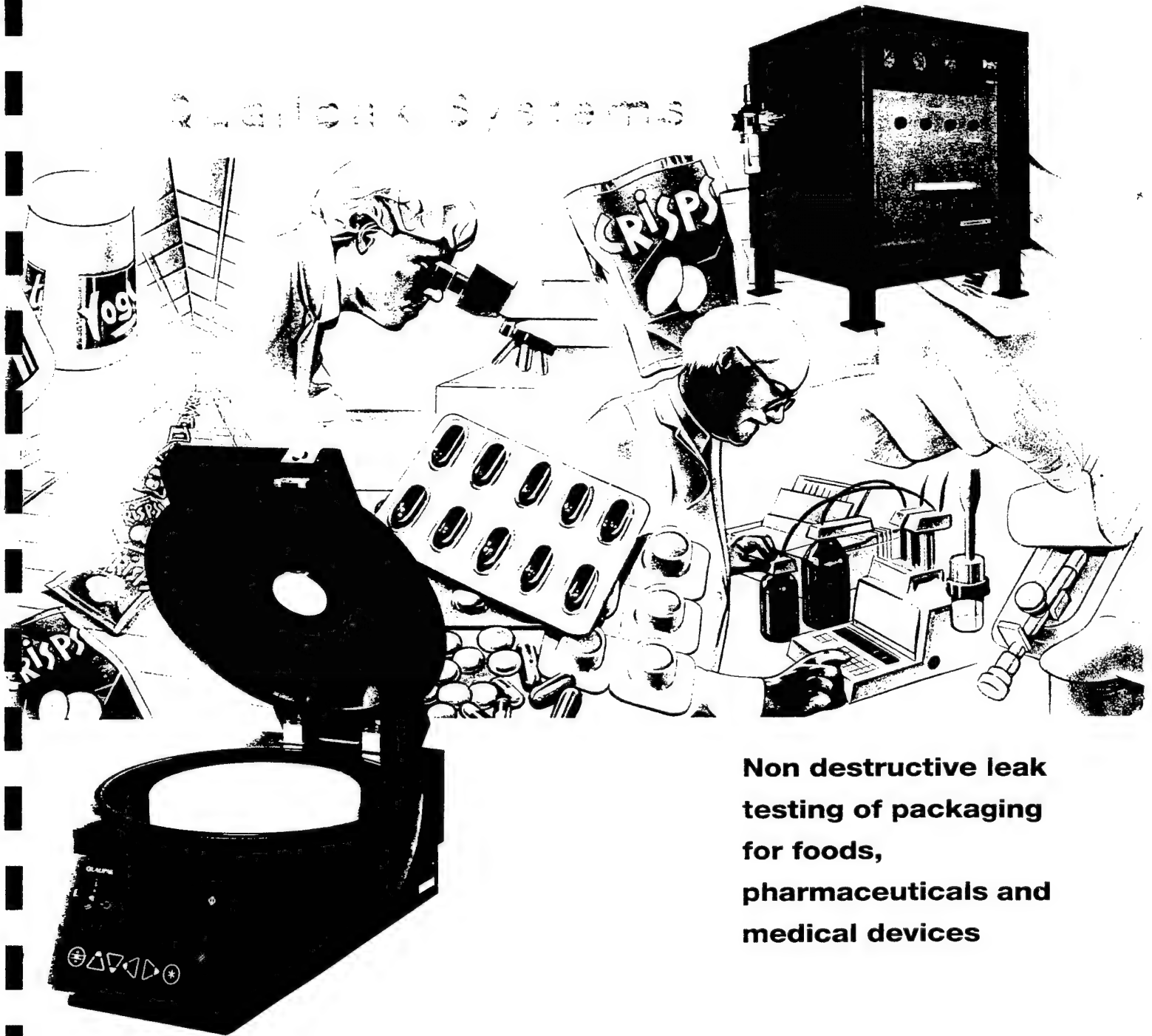
ITI Qualitek also supplies:

- Trace Gas Portable Leak Detectors
- Seal Integrity Testers for Flexible Packages
- Air Leak & Flow Testers

Your local representative is:

ITI
QUALITEK

Qualitek Systems



**Non destructive leak
testing of packaging
for foods,
pharmaceuticals and
medical devices**

QUALIPAK TESTING ASSU

Protection of the product is the principal requirement of packaging, and is particularly important in the Food, Pharmaceuticals and Medical Product industries.

Qualipak systems are designed to test flexible and blister packs for any weakness or flaw in the seals and materials which may result in contamination or deterioration of the product.

Not only is product quality improved but Qualipak testing provides operational and significant cost benefits by:

- Non destructive leak testing of the product
- Clean and simple operation
- Objective and quantifiable measurements
- Compliance with GMP

Qualipak Systems in Operation

The increasingly stringent demands on packaging to protect for longer time periods has required the development of better testing methods to remove subjective judgements.

Well proven leak detection technology is used to monitor package quality rapidly and reliably with the facility to generate valuable data for trend and potential risk analysis.

For Food

in maintaining hygiene and safety standards, reducing contamination risks and improving quality. Testing snacks, convenience foods, coffee, soups and many more with the Qualipak 171.

For Pharmaceuticals

to minimise the risk of pack penetration and possible contamination by bacteria, air and water. Testing medical preparations, drugs, tablets and pills with the Qualipak 170 and 171.

Testing On-line or in the Laboratory

Qualipak systems are designed for both production and laboratory use, whether for dedicated or multi-line testing.

Easily integrated into current QA strategies. Qualipak systems are designed for operation by non-specialist personnel. They feature, control software, test parameters and data that are protected in accordance with the latest QA procedures to ensure integrity of the results.

Meets GMP Requirements

Qualipak systems are designed to assist users in complying with Good Manufacturing Practices. The testing parameters and result information can be output to a printer or compatible data acquisition system to provide complete traceability. Each test record can be provided with product, line and batch identification, which is time and date stamped with provision for the operator's signature.

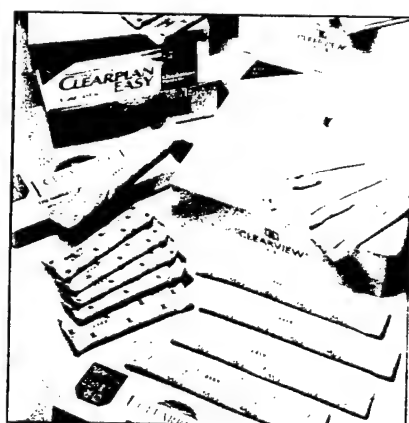
A bi-directional RS232 interface port is provided for remote control and down-loading to a central computer.

All Qualipak products are validated to the ISO9001 quality standard and their performance may be routinely checked with calibrated leaks.



TEST PARAMETERS		
PARAMETER	UNITS	VALUE
Pre Vacuum	Seconds	0
Pre Evac Time	Seconds	0.6
Test Vacuum	bar	10
Evac Time	Seconds	1
Evac Tolerance	Seconds	10
Stab Time	Seconds	10
Gross Limit	Strain	13000
Decay Limit	d Strain	300
Test Time	Seconds	10

▲ Qualipak 171 data ou



For Medical Devices

to maintain absolute cleanliness and prevent the spread of infection. Testing diagnostic kits, I.V. devices and sterile packed instruments with the Qualipak 171.

ING PACKAGING QUALITY

Qualipak 171 for Flexible Packaging

The Qualipak 171 is a self contained, easily transportable test station, equally applicable to low volume production and multi-line manufacturing installations.

Its features

- High sensitivity, detecting holes down to 12.5µ holes
- New sensor, no moving parts for greater reliability
- Validation of performance
- Simple program set up and storage

Setting New Standards

The new strain gauge transducer gives extreme sensitivity and excellent resolution for precise and repeatable measurements to be made.

This allows widely different pack sizes and volumes to be tested with unrivalled flexibility in a easily accessible test chamber. The accurate reliable performance emanates from the simple durable design which



fully complies with IP55, safety and EMC standards.

Easy to Use

Operation could not be simpler. After setting up the programme test parameters via the membrane keypad and alphanumeric display, the pack is loaded, the lid closed and the test sequence initiated by the press of a button. On completion a green pass or red reject light is activated and the result detail and testing statistics are displayed for rapid reference. For operator convenience, up to 16 programs can be stored in memory.

Qualipak 171 test results

TEST RESULT	
CURRENT TEST RESULTS	
DATE	MAY 11 1995
TIME	14:22
PROGRAM	PROG 1
CH ID	J 070 2 99
NUMBER	A1
AT START OF TEST	197
AT END OF TEST	7238
STATISTICS	
OF PASSES	195
OF REJECTS	2
TESTS	197

Qualipak 170 for Blister and MAP Packs

The Qualipak 170 has been developed for the pharmaceutical industry and systems are supplied to user specification. Key features are

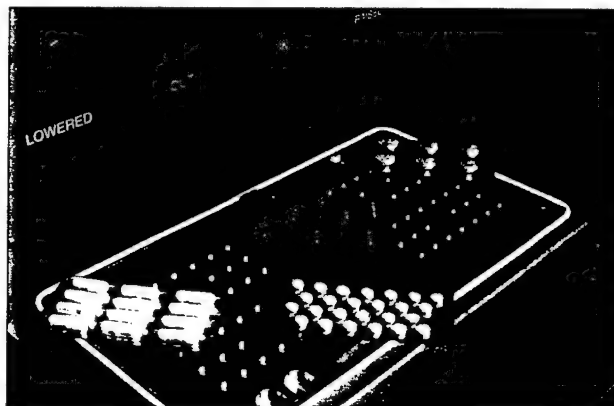
- Detection of < 25µ holes
- Computer control and data handling
- Easily interpreted display of results
- High reproducibility

Pinpoints faulty pockets

The patented Capacitance Array detector enables the location of leaks on the packs to be detected and pictorially displayed on the computer. Results are recorded on the integral database for interrogation and analysis to detect trends and potential problems.

Rapid set up and test procedure

The test parameters, display details and report requirements are entered into the system using



a standard keyboard and can be stored and security protected for future use. The test cycle is completed in typically 10 seconds with an immediate display of the results.

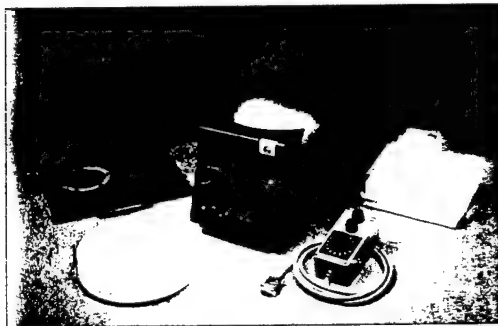
Handles different pack formats

The customised test jigs are quickly interchangeable to allow packs of different size and configuration to be evaluated.

Systems and Special Engineering

Some packaging shapes, sizes and test requirements may be outside the capacity of the standard Qualipak 170 and 171 specifications

Where this is the case a custom engineering service is available with a technical team to advise the user and develop a system for the application. Such special needs vary from the ability to handle extra large packs through to the supply of a completely automatic turnkey test station. The vast experience of the Company in the testing techniques, the instrumentation and from many installations ensures the development of efficient and cost effective solutions.



Qualipak 171 with accessories

The company is an accredited ISO9001 firm of assured quality and has a world-wide reputation for expertise in designing, manufacturing and supplying leak detection systems to a broad range of industrial and scientific organisations. Their prime applications are in quality assurance, where the product integrity is monitored and reported against rigorously defined standards.

The company offers a dynamic blend of scientific and engineering expertise, with a first rate after sales service and support.

Specifications

Qualipak 171

Sensitivity	<12.5µ hole size
Test capacity	Packs up to 10 x 21 x 27 cm 4 x 8.5 x 10.5 ins)
Number of programs	16 user definable
Display	20 character alpha numeric
Indicators	Green pass and Red fail lamps
Supplies and services	120-240 V, 50/60 Hz External vacuum source
Accessories	Custom made infills Printer kit Remote Start/Reset, Pass, Fail, and Program selection unit Calibrated orifice validator unit Vacuum pump kit

Qualipak 170

Sensitivity	<25µ hole size
Test capacity	Up to 8 packs
Number of programs	Unlimited, user definable
Supplies and services	120-240 V, 50/60 Hz Compressed air
PC controller	Supplied to customer requirements

Due to continual development the manufacturer reserves the right to change the specification without notice.

WE HAVE MOVED

PLEASE MAKE A
NOTE OF OUR
NEW ADDRESS,
PHONE AND FAX

ITI QUALITEK

267 Boston Road
Billerica, MA 01862-2310
tel 508-670-1113
fax 508-670-1114

Head Office

Ai CAMBRIDGE LTD

London Road
Pampisford
Cambridge CB2 4EF

tel: +44 (0) 1223 834420
fax: +44 (0) 1223 835050
email: 100436.3674@compuserve.com

For Sales and Service information in Germany

MELTRON MESSTECHNIK GMBH

Postfach 1248
41336 Korschenbroich

tel: 02161/64511
fax: 02161/642909



Authorised Distributor

Appendix 6.6.4

Packaging Technology & Inspection Proposal

**REQUEST FOR PROPOSAL
THIS IS NOT AN ORDER**

**RUTGERS — THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
P.O. BOX 6999
PISCATAWAY, NJ 08855-6999**

THE R.F.P. NUMBER MUST APPEAR ON ALL
CORRESPONDENCE REGARDING THIS
PROPOSAL

R.F.P. 7-04-08-2

1. RETURN SIGNED PROPOSAL IN A SEALED ENVELOPE. SHOW R.F.P. # ON OUTSIDE OF ENVELOPE
2. IN EVENT OF THIS PROPOSAL BEING ACCEPTED, A PURCHASE ORDER WILL BE SENT.
3. SEE REVERSE SIDE FOR TERMS & CONDITIONS

4. ANY EXPENSE INCURRED BY THE BIDDER IN CONNECTION WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE BIDDER
5. IF PROPOSAL IS NOT F.O.B. DESTINATION, YOU MUST SHOW COST OF FREIGHT AS A SEPARATE ITEM

**Packaging Technologies & Inspection
Attn: Tony Stauffer
145 Main Street
Tuckahoe, NY 10707**

DATE 4/8/97	THIS R.F.P. WILL BE OPENED: May 2, 1997	2:00 PM	BY <i>[Signature]</i> DIRECTOR OF PURCHASES
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PLEASE QUOTE THE FOLLOWING F.O.B. DESTINATION

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY requests proposals for the design, manufacture and installation of an "MRE Pouch" Leak Tester in accordance with the attached specifications and following notes:

NOTES:

- A. IT SHALL BE THE RESPONSIBILITY OF THE BIDDER TO VERIFY FIELD CONDITIONS PRIOR TO SUBMITTING A BID. SUBMISSION OF A BID INDICATES ACKNOWLEDGEMENT AND AGREEMENT OF THE CONDITIONS TO BE MET AND THAT THE BIDDER FULLY UNDERSTANDS THE EXTENT OF THE OBLIGATION AND NOT MAKE ANY CLAIM FOR, OR HAVE RIGHT TO CANCELLATION OR RELIEF WITHOUT PENALTY OF THE CONTRACT BECAUSE OF ANY MISUNDERSTANDING OR LACK OF INFORMATION.
- B. TECHNICAL QUESTIONS PERTAINING TO SPECIFICATIONS ARE TO BE DIRECTED TO MR. NEAL LITMAN AT (908) 445-6137.
- C. QUESTIONS PERTAINING TO PROPOSAL PROCEDURES ARE DIRECTED TO MR. MICHAEL DUNN AT (908) 445-5070.
- D. THE FOLLOWING MUST BE ADDRESSED IN DETAIL WITH EACH PROPOSAL AND WILL BE CONSIDERED IN THE EVALUATION: DELIVERY, PERFORMANCE, ENGINEERING FEATURES, COST, SERVICE, AND TRAINING.
- E. PRICES ARE TO BE F.O.B. DELIVERED TO RUTGERS UNIVERSITY FOOD MANUFACTURING TECHNOLOGY FACILITY, 120 NEW ENGLAND AVENUE, PISCATAWAY, NEW JERSEY (SEE SECTION 7.0 OF SPECIFICATIONS FOR ALTERNATE SITES.) ADDITIONAL COSTS (IF ANY) ARE TO BE INCLUDED WITH YOUR OPTION PRICES AS DETAILED IN NOTE F.
- F. ALL OPTIONAL EQUIPMENT RECOMMENDED SPARE PARTS, AND ACCESSORIES SHALL BE PRICED INDIVIDUALLY AND INCLUDED ON COMPANY LETTERHEAD AND INCLUDED WITH YOUR PROPOSAL.
- G. BIDDERS ARE REQUESTED TO SUBMIT THREE COMPLETE SETS OF THE PROPOSAL.

PLEASE INDICATE COST OF PROPOSAL AS FOLLOWS:

LUMP SUM \$ 575,500.00
DELIVERY & INSTALLATION 21 DAYS ARO.

1. PLEASE NOTE ADDITIONAL TERMS & CONDITIONS ON REVERSE SIDE OF THIS SHEET.
2. ALL RUTGERS UNIVERSITY TERMS AND CONDITIONS WILL BECOME PART OF ANY CONTRACT(S) AWARDED AS A RESULT OF THE REQUEST FOR BID OR PROPOSAL, WHETHER STATED IN PART, IN SUMMARY OR BY REFERENCE. IN THE EVENT THE BIDDER'S TERMS AND CONDITIONS CONFLICT WITH RUTGERS, THE RUTGERS TERMS AND CONDITIONS WILL PREVAIL, UNLESS THE BIDDER IS NOTIFIED IN WRITING OF RUTGERS ACCEPTANCE OF THE BIDDER'S TERMS AND CONDITIONS.
3. ANY EXPENSE INCURRED BY THE VENDOR IN CONNECTION WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE VENDOR.
4. READ THE ENTIRE PROPOSAL INCLUDING ALL TERMS, CONDITIONS AND SPECIFICATIONS.
5. PROPOSAL DOCUMENTS ARE TO BE SUBMITTED IN INK, ANY PRICE ALTERATIONS I.E. WHITEOUTS, CROSSOUTS AND ERASURES MUST BE INITIALED OTHERWISE THE PROPOSAL WILL BE REJECTED. (SEE NUMBER 17, TERMS & CONDITIONS)

SIGNATURE OF THE BIDDER ATTESTS THAT THE BIDDER HAS READ, UNDERSTANDS, AND AGREES TO ALL TERMS, CONDITIONS, AND SPECIFICATIONS SET FORTH IN THE REQUEST FOR PROPOSAL UNLESS OTHERWISE STATED IN WRITING AND SUBMITTED WITH THE PROPOSAL. FURTHERMORE, SIGNATURE BY THE BIDDER SIGNIFIES THAT THIS IS A CONTRACT IMMEDIATELY UPON RECEIPT OF THE PURCHASE ORDER FROM RUTGERS UNIVERSITY FOR ANY OR ALL OF THE ITEMS, AND FOR THE LENGTH OF TIME INDICATED IN THE PROPOSAL. FAILURE TO ACCEPT A CONTRACT WITHIN THE TIME PERIOD INDICATED IN THE PROPOSAL, TO HOLD PRICES OR MEET ANY OTHER TERMS AND CONDITIONS AS DEFINED IN THE PROPOSAL DURING THE TERM OF THE CONTRACT, SHALL CONSTITUTE A BREACH AND WILL RESULT IN SUSPENSION OR DISBARMENT FROM FURTHER BIDDING TO RUTGERS UNIVERSITY.

REFER ALL QUESTIONS REGARDING THIS REQUEST TO: MICHAEL DUNN/H/(908)445-5070	NOTE: SHOW ALL TAXES AS SEPARATE ITEM	GRAND TOTAL → \$575,500.00
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THIS SPACE TO BE FILLED IN BY BIDDER

SHIPMENT CAN BE MADE IN 8 months DAYS FROM RECEIPT OF ORDER

FOA Tuckahoe, NY
35% down payment with P.O.
TERMS: 55% at factory acceptance

We quote you as above subject to the Terms and Conditions on the reverse.

SIGNATURE: *[Signature]*
PRINT NAME AND TITLE
Tony Stauffer, President 914-337-
PHONE F

**REQUEST FOR PROPOSAL
THIS IS NOT AN ORDER**

**RUTGERS — THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
P.O. BOX 6999
PISCATAWAY, NJ 08855-6999**

THE RFP NUMBER MUST APPEAR ON ALL
CORRESPONDENCE REGARDING THIS
PROPOSAL

R.F.P. 7-04-08-2

1. RETURN SIGNED PROPOSAL IN A SEALED ENVELOPE SHOW
R.F.P. # ON OUTSIDE OF ENVELOPE
2. IN EVENT OF THIS PROPOSAL BEING ACCEPTED, A PURCHASE
ORDER WILL BE SENT
3. SEE REVERSE SIDE FOR TERMS & CONDITIONS

4. ANY EXPENSE INCURRED BY THE BIDDER IN CONNECTION
WITH THIS PROPOSAL IS THE SOLE RESPONSIBILITY OF THE
BIDDER
5. IF PROPOSAL IS NOT F.O.B. DESTINATION, YOU MUST SHOW
COST OF FREIGHT AS A SEPARATE ITEM.

**Packaging Technologies & Inspection
Attn: Tony Stauffer
145 Main Street
Tuckahoe, NY 10707**

DATE	THIS RFP WILL BE OPENED	2:00 PM	BY
4/8/97	May 2, 1997		
PLEASE QUOTE THE FOLLOWING F.O.B. DESTINATION			DIRECTOR OF PURCHASES

6. THIS (ORIGINAL LEGAL SIZE SHEET) REQUEST FOR PROPOSAL FORM "MUST" BE SIGNED AT THE BOTTOM AND RETURNED WITH THE BID SHEET(S). YOUR ENTIRE BID WILL BE REJECTED AND DISQUALIFIED IF THIS FORM IS "NOT" SIGNED AND RETURNED ON OR BEFORE THE BID DUE DATE AND TIME. FURTHERMORE BIDDERS WHO WISH TO REMAIN ON OUR "QUALIFIED" BIDDERS LIST SHOULD ALSO SIGN AND RETURN THIS BID FORM INDICATING REASON(S) FOR NOT SUBMITTING BIDS OR PROPOSALS.

7. PROPOSALS SHOULD BE RETURNED IN THE ENCLOSED YELLOW ENVELOPE OR ATTACH THE YELLOW ENVELOPE TO THE OUTSIDE OF A LARGE ENVELOPE, IF NECESSARY. TELEGRAPHIC AND FACSIMILE PROPOSALS ARE NOT ACCEPTABLE. BIDDERS MUST SUBMIT SEALED BIDS ONLY. ANY COMMUNICATION (SUCH AS FACSIMILE TRANSMITTAL), WHICH REVEALS THE CONTENTS OF A SEALED PROPOSAL WILL RESULT IN DISQUALIFICATION OF THE ENTIRE PROPOSAL.

8. IT IS THE BIDDERS RESPONSIBILITY TO SEE THAT THEIR PROPOSAL ARRIVES AT THE UNIVERSITY PROCUREMENT & CONTRACTING OFFICE BEFORE THE PROPOSAL OPENING DATE AND TIME.

9. PROPOSALS DELIVERED IN PERSON OR BY EXPRESS SERVICE SHOULD BE TO OUR ACTUAL LOCATION.

THIS LOCATION IS:

RUTGERS-THE STATE UNIVERSITY OF NEW JERSEY
UNIVERSITY PROCUREMENT AND CONTRACTING
ADMIN. SERVICES ANNEX BLDG. 1 RM. 101
DAVIDSON ROAD/BUSCH CAMPUS
P.O. BOX 6999
PISCATAWAY, NEW JERSEY 08855-6999

10. ALL CASH TERMS WILL BE ACCEPTABLE, HOWEVER, TERMS LESS THAN 3%-30 DAYS WILL NOT BE CONSIDERED IN THE BID AWARD.

11. ANY ADDENDUMS TO THIS REQUEST FOR PROPOSAL MUST BE ACKNOWLEDGED BY SIGNATURE BELOW. FAILURE TO COMPLY WILL RESULT IN REJECTION OF PROPOSAL.

YOU MUST SIGN BELOW FOR EACH ADDENDUM RECEIVED.

ADDENDUM: #1 _____ (Signature)

#2 _____ (Signature)

#3 _____ (Signature)

12. BIDDERS MUST COMPLY WITH ALL PROPOSAL ENCLOSURES AND MUST RETURN CERTAIN ENCLOSURES WITH PROPOSAL FORM. PHOTOCOPIES OF ANY REQUIRED ENCLOSURES ARE NOT VALID. THOSE INDICATED MUST HAVE ORIGINAL SIGNATURES AND NOTARY SEAL. FAILURE TO COMPLY WILL RESULT IN REJECTION OF PROPOSAL.

THEY ARE: (1) N.J. PL 1977 C.33 (MUST BE SIGNED AND RETURNED)
(2) NON-COLLUSION STATEMENT MCS-1 (MUST BE NOTARIZED)
(3) AFFIDAVIT (MUST BE NOTARIZED)

13. A. REQUIREMENT TO BE PROVIDED BY SUCCESSFUL BIDDER AFTER PROPOSAL AWARD IS MADE.

(1) PL 1975 C.127 WITHIN SEVEN (7) DAYS AFTER RECEIPT OF PURCHASE ORDER.
NOTE: "IF AWARDED CONTRACT YOUR COMPANY/FIRM WILL BE REQUIRED TO COMPLY WITH THE REQUIREMENTS OF PL 1975 C.127. (NJAC17:27)"

(2) INSURANCE, AFTER AWARD AND PRIOR TO START OF WORK.

B. SUPPLEMENTAL TERMS & CONDITIONS, FORM STC-1 IS A NOTICE OF REQUIREMENT FOR COMPLIANCE BY BIDDER TO WHOM AN AWARD IS MADE AND IS TO BE RETAINED BY BIDDER.

ADDITIONAL ENCLOSURES ARE: DID YOU SHEET/SPECIFICATIONS

14. ALL PROPOSALS SUBMITTED TO RUTGERS UNIVERSITY, PROCUREMENT & CONTRACTING WILL BECOME PUBLIC INFORMATION AS OF THE PROPOSAL OPENING DATE AND TIME.

15. NOTE PERMITS - SEE ATTACHMENT PL1. - ATTACHED _____ NOT APPLICABLE X

REFER ALL QUESTIONS REGARDING THIS REQUEST TO: MICHAEL DUNN/H/(908)445-5070	NOTE: SHOW ALL TAXES AS SEPARATE ITEM	GRAND TOTAL ➡
--	---------------------------------------	---------------

THIS SPACE TO BE FILLED IN BY BIDDER	
SHIPMENT CAN BE MADE IN _____ DAYS FROM RECEIPT OF ORDER	We quote you as above subject to the Terms and Conditions on the reverse.
FOB:	SIGNATURE:
TERMS:	PRINT NAME AND TITLE: Tony Stauffer, President PHONE NUMBER: 914-337-2005

PROPOSAL

Customer: **The State University of New Jersey, Rutgers**
Attn. Mr. Michael Dunn
P.O. Box 6999
Piscataway, NJ 08855-6999

- Index:
1. **Quantity 3 Quotations, which include:**
 - a. Delivery
 - b. Performance
 - c. Cost
 - d. Warranty
 - e. Training
 - f. Service
 - g. Parts Recommendation
 - h. Machine Layout
 2. **PTI Organization**
 3. **Engineering Features:**
 - a. PTI / WILCO Introduction / Company Profile
 - b. WILCO Test Methods
 4. **Sample of Service Manual**
 5. **Literature of PTI Product Lines**



Packaging Technologies & Inspection

145 Main Street • Tuckahoe, NY 10707 • USA
914-337-2005 • FAX 914-337-8519

e-mail: pti@ptipacktech.com
<http://www.ptipacktech.com>

May 02, 1997
Quotation # W-97197/HW

Mr. Michael Dunn
RUTGERS - The State University of New Jersey
P. O. Box 6999
Piscataway, NJ 08855-6999

RE: Proposal for an "MRE Pouch" Leak Tester, Type WILCOMAT W-16 STI/F SPECIAL

1. BASIC MACHINE FUNCTION AND DESCRIPTION:

The Wilcomat W-16 STI/F Special is specifically designed for the detection of leaks in MRE pouches. The Wilcomat W-16 STI/F Special will be located at the discharge conveyor of the existing cartoning machine where the 16 pouches are moved to two different stations with a special handling system. Station #1, consists of a vacuum chamber to prepare pouches for leak detection, and station #2 consists of individual test station, each of which are equipped with high precision measuring system which offers fully automatic leak detection for MRE pouches.

2. THE WILCOMAT W16-STI/F SPECIAL CONSISTS OF:

- Sixteen (16) special hermetic test chambers each having:
 - High resolution modular electronic load force sensors with solid state amplifiers.
- Test system cabinet on telescoping leveling feet, with reserve vacuum tank, pneumatic controls, electrical controls, electric vacuum pump, and main air inlet filter.
- One WILCO micro processor controller for the testing system, transport system and for self-checking of all functions.
- Remote control panel on vertical arm off the test system cabinet with the following:
 - Menu driven soft touch keypad for setting of all test criteria and reference units. Also set MIN/MAX absolute readable reference point.
 - System on/off switch, conveyor control switches, and all operating lights.
- Infeed conveyor with special pneumatic operated pouch handling system.
 - Stopper units for prepositioning of 16 MRE pouches in front of the pneumatic loading system for infeed to test stations, and a prestopper assembly for proper position of MRE pouches into automatic loading stoppers.
 - Pneumatically operated unit to load the MRE pouch from the infeed belt conveyor to the test stations.
- Exit conveyor with pneumatic eject station of previously earmarked leakers.
- Electrical connections to meet NEMA4 requirements with easy clean (washdown) features.
- Material of construction: 304 stainless steel and anodized aluminum

3. OPERATION:

The MRE pouches are prespaced into 16 units on the customers cartoning discharge conveyor, where they are loaded by a single pusher unit into the WILCO preparation chamber, where a vacuum is exerted on all 16 pouches. Then the pouches are fed by the WILCO feeding system which will separate the MRE pouches and position them in front of the individual test chambers. A pneumatically controlled loading unit transports the MRE pouches onto the test stations. When the 16 MRE pouches are in place, the testing chambers are lowered over the MRE pouches and close on the tester base plate. Each test station has a controlled vacuum drawn in the test cavity by a self contained vacuum pump. Response of each pouch is detected by a special load force sensor. A mechanical load force will then be applied to the pouch. During the test cycle measurement, any pouch thickness variation will be measured and evaluated.

At the end of the test cycle all 16 MRE pouches will be pushed on a 3 foot exit conveyor via an exit unloading device.

If any of the stations indicates an MRE pouch as a leaker, it will automatically be removed from the tester on the exit conveyor. The good MRE pouch will proceed on the exit conveyor, for transfer to plant conveying system.

4. SPECIFICATIONS:

Package:	MRE Pouch size 4.75" x 0.625" x 8.125" Packed in a carton
Machine Size:	Approximately 3,5m long with 2m
Output:	100 MRE pouches per minute
Test sensitivity:	300-600 and above micron hole size This rate can only be achieved with even operating conditions and consistent product specifications.
Leak Efficiency:	80 - 85%
Operations:	Minimum operating efficiency 98%
Test vacuum range:	950mbar vacuum
Primary air:	75 - 110 PSI (5 to 8 Bar)
Primary power:	460 VAC, 60 cycles, three phase

May 02, 1997
Quotation # W-97197/HW
Page # 3

5. **BASE PRICE:** **\$ 575,500.00**
FOB Tuckahoe, NY

The price is based on a foreign exchange rate of Sfr. 1.45 / USD \$1.00 and will be adjusted at the time an order or firm commitment is received from the customer to the then prevailing foreign spot and future exchange rates.

For multiple orders of the same machine a discount will apply.

6. **OPTIONS:**
- Data logging system for recording of all specifications with regard to leak testing. Includes RS-232 interface with special software and with high quality printer and support stand. **Included**
 - Infeed & Exit conveyor **Included**
 - Recommended spare parts estimated cost: **24,750.00**
If recommended spare parts are ordered 4 months prior to machine shipment 10% discount will be applied to standard spare parts prices.
 - Estimated delivery charges for different locations:
 - Rutgers University, NJ **1,000.00**
 - Evansville, IN **2,500.00**
 - Cincinnati, OH **2,200.00**
 - Mullins, SC **1,800.00**

7. **TERMS:**
- 35% down payment with the purchase order, 55% at factory acceptance prior to shipping, balance due net 30 days after shipping.

8. **DELIVERY:**
- 8 months from receipt of purchase order and downpayment and clarification of all technical details, subject to confirmations.

9. **MACHINE TESTING:**
- Each machine is tested thoroughly before it leaves our plant with MRE pouches supplied by you. You must be certain that we have all the MRE pouches to be tested and detailed drawings for design of chambers and final testing of system.

10. **ACCEPTANCE TESTING:**
- At manufacturer's factory prior to shipping, estimated time for acceptance testing to be 3 to 5 days.

May 02, 1997
Quotation # W-97197/HW
Page # 4

11. **INSTALLATION, START-UP, & TRAINING:**

A service engineer will be provided for installation, start-up and training for a period of five (5) working days. Any additional time required by customer for assistance will be billed at the prevailing rate (currently \$105.00 per hour) and travel time at \$70.00 per hour. All travel and living expenses incurred by our service engineer will be billed at cost to the customer. Customer is responsible for uncrating of equipment and putting machine in place, with power and utilities ready to hook up.

12. **SERVICE / PARTS:**

All service will be available within 24 hours at the rate of \$105.00/hour with all travel and living expenses at cost.

All standard parts are stocked at PTI, Tuckahoe, NY

13. **WARRANTY:**

PTI warrants products to the buyer for a period of 12 months or 2,000 hours whichever occurs first from the date of shipment to be free from defects in workmanship and materials. Warranty service time will be at PTI's expense and applies only to those items that are determined to be defective during the warranty period. Any additional services rendered will be invoiced at our current rates. All Warranty travel and living expenses incurred by our service engineer will be billed at cost to the customer.

14. **TERMS AND CONDITIONS:**

See attached Standard Terms and Conditions, which form an integral part of this quotation and shall supersede all other Terms and Conditions unless otherwise specified here in this quotation.

This quotation is good for 30 days from date of issuance.

If you have any questions regarding this quotation, please feel free to contact us.

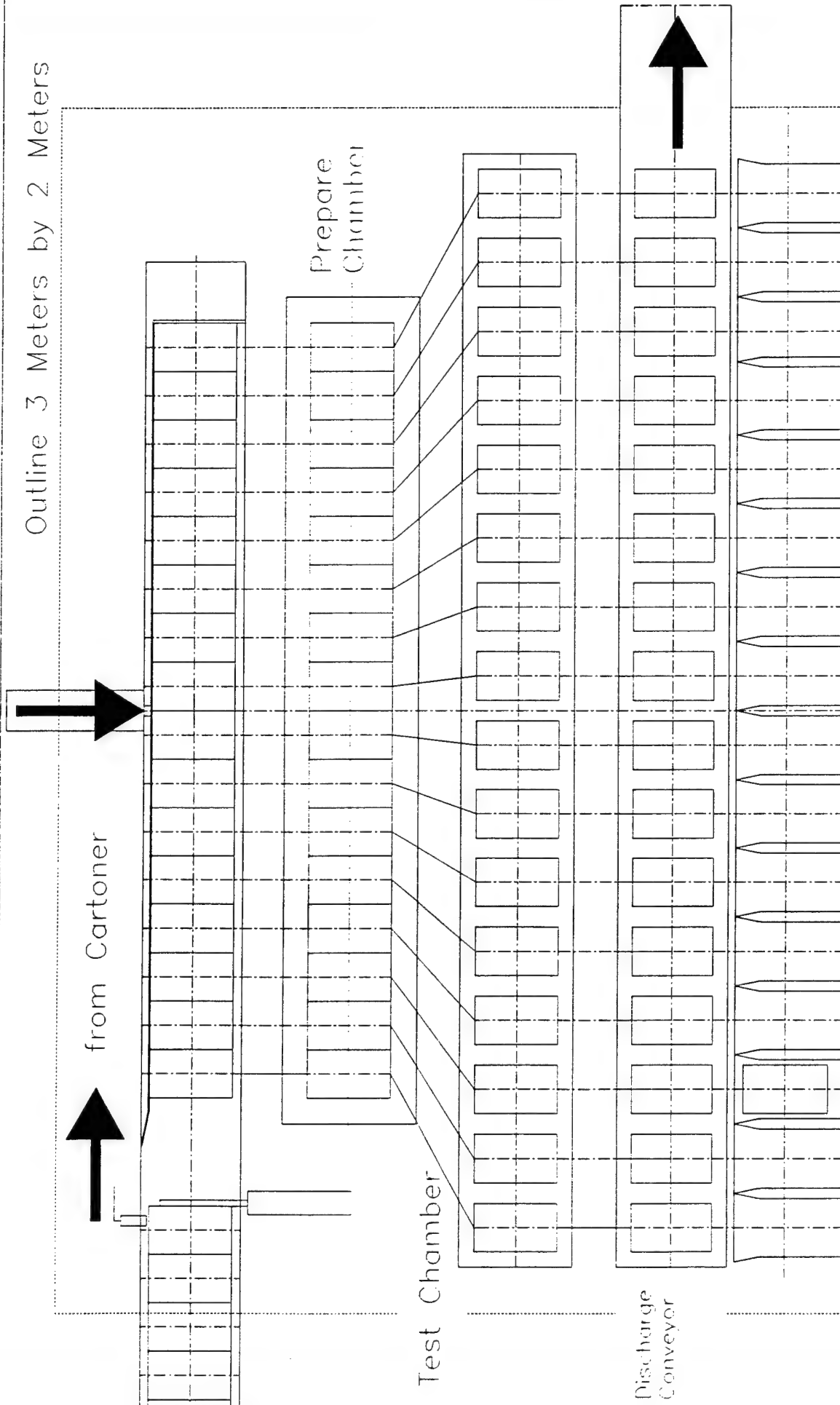
Sincerely,
Packaging Technologies & Inspection



Heinz Wolf
General Manager

cc: Tony Stauffer - PTI

Outline 3 Meters by 2 Meters



Reject chute for leaky pouches

PTI
WILCO

Tolerances: 0.010 unless
otherwise specified

Date: 5/1/97

Drawn By: Rudy Muller

DWG No.: WM1052A

Scale: NTS

Mach. Lay out

Qty Description

Mat Customer

RUTIGERS



Packaging Technologies & Inspection

STANDARD TERMS AND CONDITIONS

1. **Applicable Terms – Firm Offer.** Prices as quoted are in U.S. dollars. The price, description and terms of Seller's offer shall remain firm for 30 days after the date on the face of this offer. This offer is expressly conditional upon Buyer's agreement with all of the terms and conditions of this offer notwithstanding any different terms that may be contained in any purchase order, acknowledgment, sales agreement, acceptance or other responsive document of Buyer. Seller expressly objects to any different or additional terms proposed by Buyer. Buyer shall be deemed to have accepted these terms and conditions either by accepting the equipment or by making any payment for the equipment.

These terms and conditions constitute the entire agreement of Seller and Buyer relating to the purchase and sale of the equipment offered and supersede all prior discussions, negotiations and agreements of the parties and their respective agents and employees. No modification shall be binding on Seller unless such modification is in writing and signed by an authorized representative of Seller. Utilization of, reference to or acceptance of Buyer's purchase order or purchase order number shall not constitute a modification of this offer.

2. **Payment Terms.** Payment for the equipment shall be made by Buyer in three installments as follows: 35% of the total price upon acceptance of this offer; 55% of the total price within 15 days of Seller's notice of readiness for preshipment inspection; and 10% of the total price within 30 days of the date of delivery of the equipment. Seller is not obligated to ship the equipment until the second payment is received by Seller. Buyer shall pay interest on overdue amounts at the lesser rate of 1½% per month or the highest rate allowed by law. If at any time Seller believes itself to be insecure or if Buyer's credit worthiness deteriorates, Seller may unilaterally revoke or revise any credit arrangements by notice to Buyer. In the event that Seller consults counsel to enforce any obligation or payment due, Buyer shall immediately reimburse Seller for all reasonable legal fees, court costs, witness/mileage fees, duplication, messenger and administration expenses connected with the enforcement or collection of any obligation or payment due regardless whether litigation results. By accepting or agreeing to accept the equipment covered by this offer, Buyer represents that it is solvent and is capable of meeting its debts as they come due and acknowledges that Seller has relied upon this representation in shipping equipment to the Buyer on credit.

Seller reserves the right to adjust prices of the equipment if the U.S. dollar to Swiss franc exchange rate (as published in *The Wall Street Journal*) fluctuates more than 2% at any time from the date the quotation has been issued until the date of shipment, unless otherwise expressly agreed in writing by Seller. Seller further reserves the right to hold Buyer responsible for any expenses incurred as a result of Buyer's late payment of invoices combined with fluctuation in the exchange rate.

3. **Cancellation by Buyer.** Once this offer has been accepted by Buyer, it shall not be countermanded, canceled or altered by Buyer except with the written consent of the Seller and the payment to Seller of any damages sustained by Seller, which damages in event of cancellation shall be construed to be not less than the first installment of 35% of the total purchase price.

4. **Cancellation by Seller.** Seller shall have the absolute right to cancel and refuse any order if, at anytime, all terms and conditions governing such order are not strictly complied with by Buyer or, if, at anytime, Buyer becomes bankrupt or insolvent.

5. **Express Warranty.** Seller warrants to the original Buyer only that the equipment shall be free from defects for twelve months from the date of delivery of the equipment to Buyer's location or 2,000 hours of service, whichever is earlier. Seller's warranty shall only apply to equipment which has been maintained according to Seller's standards, utilized only on product and packaging materials that were provided for pre-delivery testing and operated by trained and competent personnel within the speeds allowed by Seller's specifications. Seller's warranty shall not extend to parts or components which are supplied by third parties. Seller's obligation with respect to third party parts or components shall be to assign to Buyer, to the extent permitted by the third party manufacturer, any warranties of that manufacturer. Seller's warranty is conditional upon Seller's receipt of a detailed written notice of specific defect within 30 days of the first occurrence of defect. Failure to give such notice shall be deemed a waiver of any right to recover for such defect. Seller shall have the option to remedy any breach of warranty by repairing the equipment on Buyer's premises or at Seller's location at the discretion of Seller; by giving Buyer an allowance to effect repair; by replacing the part or equipment; or by refunding the purchase price upon return of the equipment at Seller's expense. Seller shall not be liable for any charge by Buyer unless authorized by Seller in writing in advance.

6. **Disclaimer.** No salesman, employee or agent of Seller has any authority to make, expand, modify or extend any warranty concerning the equipment beyond the written specifications contained in this offer. Buyer acknowledges and represents that Buyer has not relied upon any statement, warranty, product description or practice other than the written specifications in making its decision to purchase equipment from Seller.

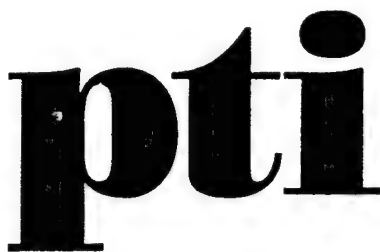
THE EXPRESS WARRANTY IS THE SOLE WARRANTY MADE BY SELLER AND IS MADE IN LIEU OF ALL OTHER WARRANTIES. ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR USE ARE DISCLAIMED REGARDLESS OF ANY KNOWLEDGE OF SELLER AS TO THE INTENDED USE OF THE EQUIPMENT.

7. **Limitation of Liability.** Buyer acknowledges that Buyer is fully aware of the capabilities and limitations of the equipment having been fully involved in the process of setting the performance standards and engineering specifications. Buyer further acknowledges that qualified, trained, competent personnel are required to operate the equipment and that use of the equipment on products or materials for which the equipment was not designed may result in unsatisfactory performance, damage to the equipment or even personal injury or property damage. Seller's liability with respect to the equipment shall be limited to the amount of money received by Seller from or on behalf of Buyer, less the fair value for the actual use of the equipment to the time of the



PTI ORGANIZATION

President:	Tony Stauffer
General Manager:	Heinz Wolf
Service Parts Manager:	John Itten
Product Manager:	Gary MacNeill
Product Manager:	Raymond Scheire
Product Engineer:	Rudy Muller
Product Engineer:	Dan Bacher
Software Specialist:	Mike Kneller
Administrative Assistant:	Marygrace Marbach
Bookkeeper:	Lisa Wray
Marketing:	Sylvia Stauffer



Packaging Technologies & Inspection

145 Main Street • Tuckahoe, NY 10707 • USA
914-337-2005 • FAX 914-337-8519

pti

Packaging Technologies & Inspection

Company History

PTI, Packaging Technologies & Inspection, formerly called Precision Tools, Inc., is the leader in packaging technologies for MAP and retort packages, easy open membrane ends as well as for nondestructive quality inspection and vision systems for pharmaceutical, medical and food packages.

PTI, Precision Tools Inc. was established in 1975, specializing in importing and distributing of specialty packaging equipment, such as the Powder Side Striping Equipment, which became the leading weld protection equipment for food cans.

In 1984 Precision Tools Inc., started distribution of the WILCO Leak Testers under the name of WILCO PRECISION TESTERS. Since then the WILCO leak testers have become the leading brand for leak detection equipment in the US.

In 1989 WILCO PRECISION TESTERS added vision systems to its product line under the name of VISI-PACK, and in 1993 PTI added the line of RYCHIGER specialty packaging machinery. At this point, PTI decided to change its name to PTI - Packaging Technologies & Inspection, since there was a shift from manufacturing precision tools to distributing and servicing packaging machinery.

Since 1984, the involvement in packaging machinery, PTI has been growing at a compound rate of 30%, and is successfully distributing package inspection equipment for the most demanding applications in the food, pharmaceutical and automotive industries.

PTI - Packaging Technologies & Inspection today has become a supplier to companies such as:

- Abbot Laboratories • Crown Cork & Seal • Kraft General Foods • Graham Containers
- Merck & Co. • Sonoco • General Motors/Delphi • McGaw • Nestle
- Proctor & Gamble • Ross Laboratories • Owens Brockway

PTI has sole distributorship of the Label Inspection System (LIS) worldwide.

5/1/97

WILCO
PRECISION TESTING • LEAK DETECTION

VISI-PACK
VISION • GAUGING • SPC

RYCHIGER
FILLING • PACKING • SEALING



Packaging Technologies & Inspection

145 Main Street • Tuckahoe, NY 10707 • USA
914-337-2005 • FAX 914-337-8519

pti

Packaging Technologies & Inspection

Company profile

PTI is the leader in packaging technologies for MAP and retort packages, easy open membrane ends as well as for nondestructive quality inspection systems for pharmaceutical, medical and food packages.

Products: The **WILCO** custom designed high speed linear, rotary, fully & semiautomatic off-line leak testers inspect medical vials, ampules, sterile blister packs, pouches, containers & packages for micro leaks, cracks, pinholes and closure leaks.

Our **VISION** systems detect dimensional and visual defects in products and containers, check label placement and defects found in a variety of labeling methods.

The **RYCHIGER** specialty packaging machinery is used for unit dose packaging of liquids, pastes, powders and viscous products, heat sealed with aluminum, paper or plastic foil with highest precision. Its other high performance machines are used for converting can ends into easy-open peelable membrane ends (EOM).

Services: Our validation specialists actively participate on ASTM, HIMA and ISO committees, seminars & forums for the medical and food packaging industries. We offer custom engineering, on-site technical support, training and turnkey installation, technical assistance and a multilingual service & parts department.

5/1/97

WILCO TEST METHODS

1. Pressure / Vacuum Differential - over 2,000 applications
2. Helium - 6 applications
3. CO₂ - 2 applications
4. Sniffer - 15 applications
5. High Voltage - 4 applications
6. Load Sensor - 2 applications

Appendix 6.7

MULD Phase I – In-Process Review, 7 May 1997

Multiple Unit Leak Detector

Phase I Activities

CORANET - Rutgers University

May 7, 1997

In-Process Review - STP #1005

Phase I Scope

Preliminary Engineering

- z Review with MRE Producers
- z Preliminary Engineering
- z Specifications
- z Economic Analysis
- z Proposal Preparation & Award Recommendation
- z In-Process Review

Background - STP #7

Technology Review

<u>Technique</u>	<u>Characteristics</u>	<u>Disadvantages</u>
Pressure Differential (Press. Decay, Displacement or Force)	Low Cost 10^{-3} to 10^{-6} cc/sec	Requires Residual gas Vacuum plugging
Tracer (Helium or Carbon Dioxide)	Very Expensive 10^{-3} to 10^{-11} cc/sec	Tracer may escape Vacuum plugging
Infrared Radiometry (N)	Detects Seal Defects	Scans 1 seal side only
Ultrasonic (R)	Detects Seal Defects	Scans 1 seal side only
Machine Vision (R)	Developmental Stage	Scans 1 side, expensive
Dye Penetrant	Destructive 10^{-6} cc/sec	Time consuming

Background - STP #21

3 Pressure Differential Units Bench Tested

z	Seal Integrity Systems - CA2000	z	Limited Application
y	External Pressure/Displacement (Prox.)	y	Expensive to implement
y	Seal leaks on HFFS before retort only	y	Development risks
z	PTI - Wilco	z	HFFS or Vertical MRE
y	Vacuum/Vacuum Decay (Press.)	y	Poor performance below 10cc R.G.
y	Accuracy 45%		
z	Applied Technology Concepts - ATC-3	z	HFFS or Vertical MRE
y	Vacuum/Displacement (LVDT)	y	20-40 sec. test cycle
y	Accuracy 72%	y	Best accuracy

Background - STP #75

Leak Test and Human Inspection Benchmark

- z ATC-3 Accuracy: 78% Combined
- z Human Inspection Accuracy: 45%
- z USDA data ('94-95): 87 lots rejected for holes
- z Benchtop Unit Improvements for On-Line
 - y Vacuum system, test cycle reduced to 10 sec.
 - y Force sensing detection
 - y Simplified analysis
 - y In-carton testing begun

ATC-3 Benchmark Tests

<u>Variable</u>	<u>Level</u>	<u>Type II Error</u>	<u>Type I Error</u>
All Samples		22%	
Residual Gas	5 cc	28	
	15	25	
	25	14	
Temperature	70 F	25	0
	85	19	0
	100	22	33
Size	300 micron	30	
	600	15	
Human Inspectors (7 Sec)		55	5

* HFFS Pouches *

Review with Producers

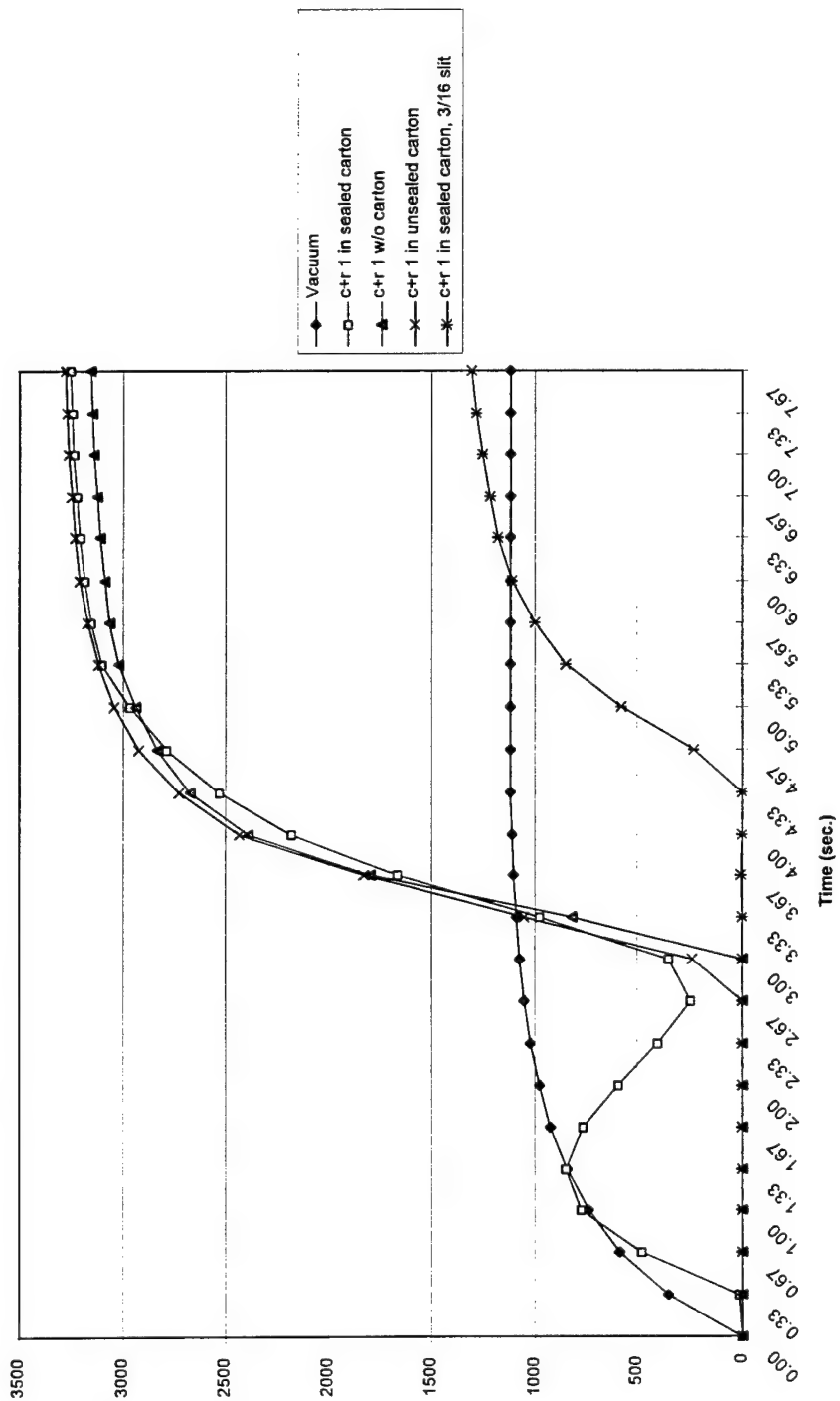
- z Coranet Workshop #6 & 7 Briefings
- z Producer Questionnaire
 - y Concept and layout
 - y System integration
- z Specification for On-Line Leak Tester
 - y Equipment specification, vendors, evaluation criteria, other resources

Preliminary Engineering

- z Modifications to Vacuum Leak Tester
 - y Vacuum System and Chamber
 - y Pouch Expansion Resistance
- z Reduced Test Time 6-8 seconds
- z Tested Pouches to 1cc Residual Gas
- z Eliminated Type I Errors
- z Bench Tested ITI Qualitek Leak Detector

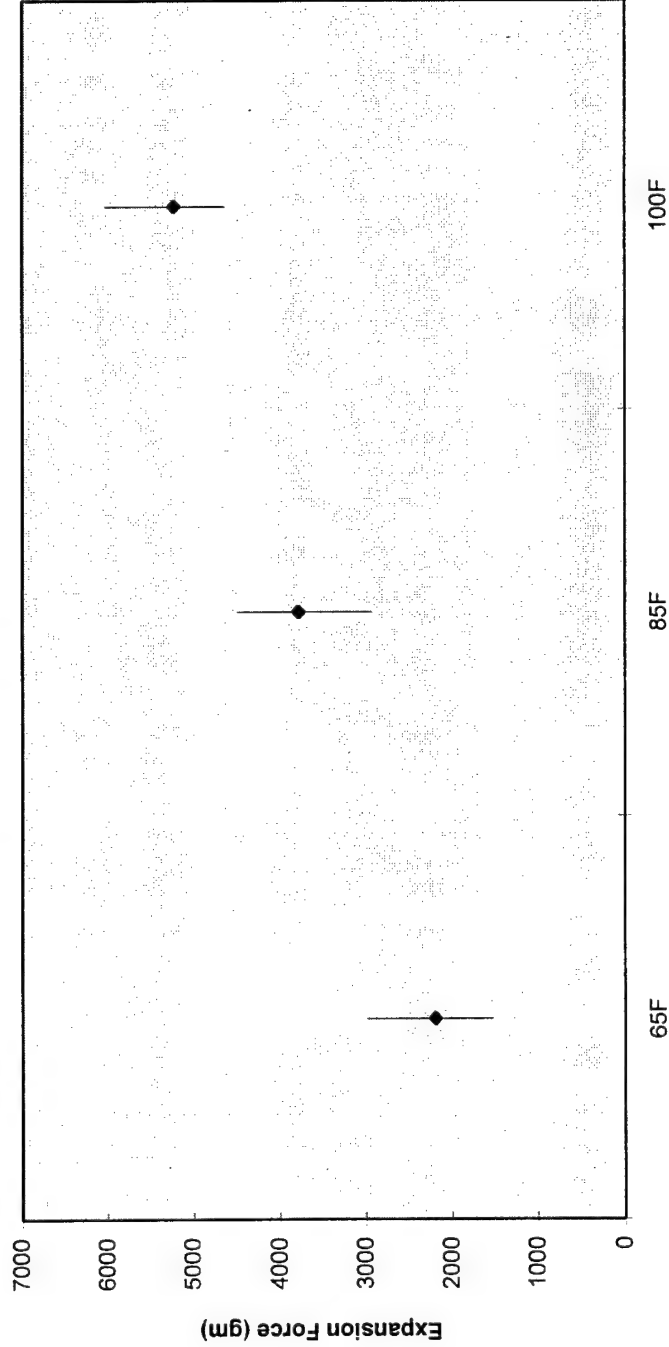
Preliminary Engineering

Chicken & Rice MRE Leak Test Response



Operating Temperature

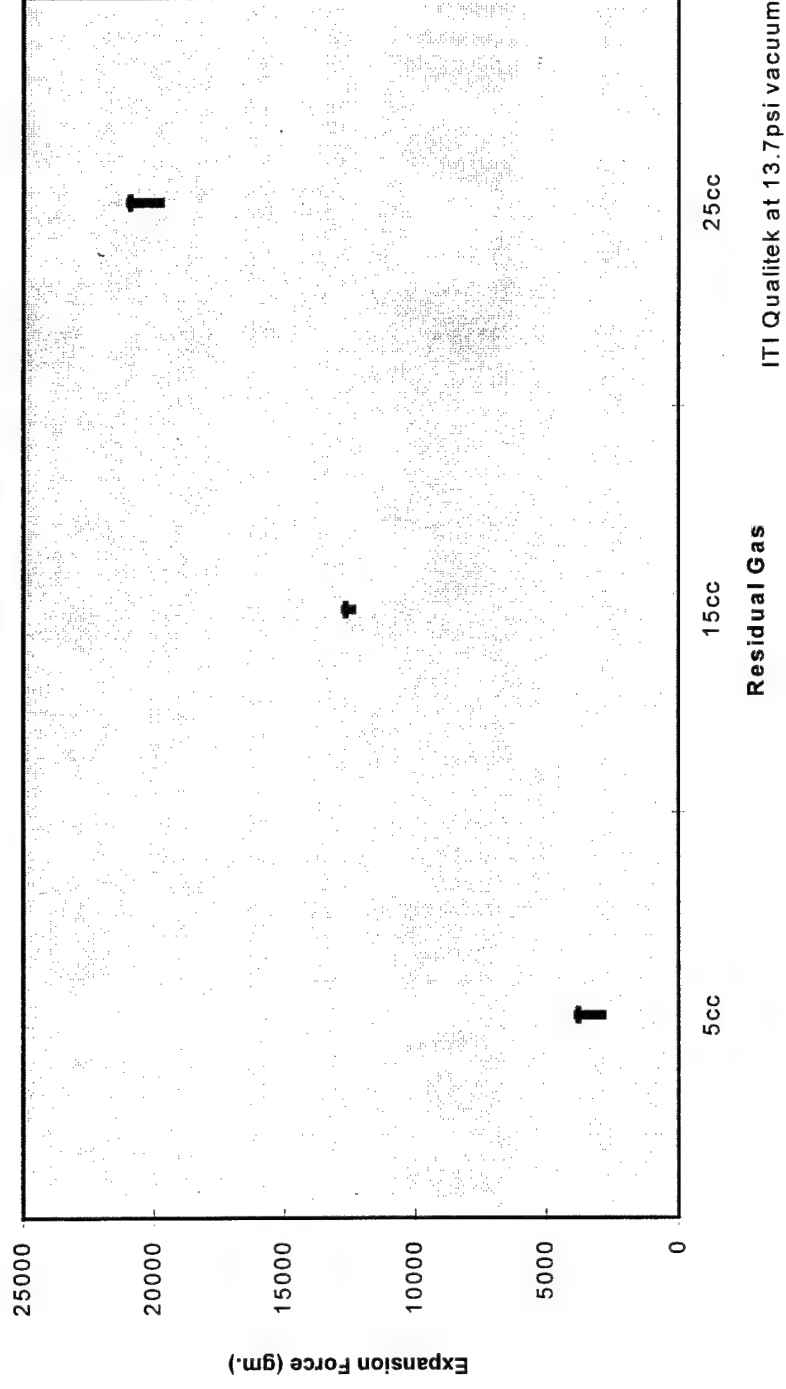
Temperature Vs. Expansion Force
Ham Slice MRE 5cc Residual Gas



ITI Qualitek at 13.7 psi vacuum

N.D. On-Line Residual Gas Test

Residual Gas Vs. Expansion Force
MRE Ham Slice at 85F



Cost/Benefit

- z No rework cost data available
- z Costs for leak defects:
 - y On-line inspection
 - y Rejected lot at producer
 - y Rejected lot at Assembler
 - y Meals on hold
 - y Meals discarded in the field
- z Potential Savings:
 - y Reduced defective lots
 - y Reduced labor
 - y Real time information
 - y Long term information
- z Breakeven: \$37K savings/yr. (assumes \$150K investment for 5 years)

Engineering Concept



concept drawing

Performance Specification

z Accuracy equivalent to Benchmark

y 0% Type I Error ($<100^{\circ}\text{F}$)

y 23% (max) Type II Error (300-600 micron)

z Production rate of 100 per minute (min)

z Package information

y Foil Laminate pouch in sealed carton

y Residual air of 0 - 10 cc

y Pouch temperature of $85^{\circ}\text{F} \pm 15$

Design Requirements

z Material Handling

- y Infeed from existing cartoner discharge
- y Discharge conveyor 12' long
- y Automatic reject into bin or tote

z Controls

- y Control panel includes PLC and/or PC
- y Information display - status, faults, rejects
- y Inkjet printer log - settings, time, statistics

RFP Recipients

- z Applied Technology Concepts, Inc
- z ITI Qualitek
- z Modern Controls Inc.
- z Nikka Densok USA, Inc
- z Packaging Technologies & Inspection
- z Precision Automation Co., Inc.
- z Rame-Hart, Inc.

Evaluation - Leak Tester RFP 7-04-08-2

Criteria	Wgt	Precision Auto	%	Rame-Hart	%	ITI - Qualitek	%	PTI - Pkg Tech	%
Cost	20	\$244,900	20	\$336,500	8	\$454,600	0	\$575,500	0
Performance	30	Test leaks 100/min. Meet accuracy specs	25	Test leaks 120/min. Exception to specs	20	Test leaks 100/min. Meet accuracy specs	25	Test leaks 100/min. Meet accuracy specs Detection eff. 85%	30
Features	30	20 vacuum chambers Nema 4 SS Concept per spec	22	20 vacuum chambers Nema 4 SS Concept modified	20	24 vacuum chambers Nema 4 SS Concept per spec Touch screen display	30	16 vacuum chambers Nema 4 SS Concept modified Preliminary Vacuum	25
Delivery	5	7 months	4	7 months	4	6.5 months	5	8 months	3
Service	10	manuals provided Allowance \$16,800	8	manuals provided No notation in quote	3	manuals provided On site service	10	manuals provided Standard parts stock	5
Training	5	Allowance \$16,800	5	3 days	2	2 weeks	5	5 days	3
SCORE	100		84		57		75		66
Employees		175		20		15 U.S.		11 U.S.	

Implementation into Producer Facilities

z Cost for each machine: \$156,950 (after Rutgers)

z Additional Costs for:

y shipping

y installation

y training

y change parts for alternate pouch sizes

y customized integration

Project Timetable

z Bids Due to Rutgers	May 2
z Vendor Selection	May 6
z In-Process Review	May 7
z Sub Contracting Complete	May 21
z Delivery (7 mo.)	Dec 19



Leak Tester Demonstration

z MRE Ham Slice, 5cc Residual Gas, 85F

z ITI Qualitek Vacuum/Force Detector

y Plant vacuum source

y Test Cycle 6 sec. (stabilization 3 sec., test 3 sec.)

y Pouch Expansion 2930 min./4477 max.

y Force Decay 0 max.

z Defects: 300, 600um holes, slits; near corners,
center; top/bottom

Appendix 6.8

MULD Operation Procedure

Appendix 6.8

MULD Operation

Please refer to equipment documentation "General Operating Instructions for Multi Unit Leak Detection Machines, MULD-100A."

1) Start Up Procedures:

a) Main Air Supply:

- i) The Main Power Supply to the system is 100PSI. In order to run the system the following must be established:
- ii) The Air supply to the main filter regulator must be on.
- iii) The main emergency dump valve must be reset.

b) Main Power:

- i) The Main Power Supply to the system is 460V, 3 Ph, 60 Hz. In order to run the system the following must be established:
- ii) The branch circuit disconnect switch servicing this control system must be closed.
- iii) The main panel circuit breaker (CB-1) with the flange mounted operating handle must be closed.

c) Control Power:

- i) The Control Power for the system is 120V, 1Ph, 60 Hz. and is provided by the control circuit transformer located in the main panel. In order to run the system the following must be established:
- ii) Fuses for Control Transformer primary protection in place.
- iii) Control circuit breakers located inside the main panel must be closed.
- iv) Emergency Stop Reset pushbutton located on the control panel is reset (Machine Controls Screen indicates status).

d) Emergency Stop:

- i) In case of an emergency the entire system may be shutdown and restarted by the following:
- ii) Emergency Stop mushroom head pushbutton located on the main control panel:
- iii) Availability - will function at anytime.
- iv) Action - will maintain all input signals to the PLC while removing all output power and shutting down all drives through hardwired contacts. PLC will be signaled to stop and abort all functionality.
- v) Restore - Reset of the "E Stop" pushbutton. Emergency Stop reset is required to restart.
- vi) Light Curtain will function as an emergency stop when machine is in auto and will inhibit any manual operations on the side activated.

e) Machine Set Up for Product to be run:

- i) Adjust conveyor guide rails for product length.
 - ii) Force adjust for product height.
- f) Download Recipe for Product to be run:

- i) Go to "Edit Program" screen.
- ii) Select desired program number.
- iii) Select Save Program.
- iv) Return to Test Mode.

2) Shut Down Procedure:

- a) Stop Machine.
- b) Purge all product from Machine.
- c) Shut down computer operating system (windows).
- d) Turn off main power.
- e) Turn off air supply (CAUTION: MAKE SURE CHAMBERS ARE CLEAR SINCE CHAMBERS WILL CLOSE WHEN AIR IS REMOVED.)

3) Data Acquisition & Recording (end of day or end of lot):

- a) Prior to shutting down Leak Test computer system, select **Data Files** from the Function screen.
- b) Insert a floppy disk into disk drive located inside main control panel.
- c) Scroll through data files to select desired date and press **Save to Floppy**. Data file names have the following date format:
 - A YearMonthDay.CSV (for chamber A)
 - B YearMonthDay.CSV (for chamber B)
- d) Collect paper printouts, if printer is in use.

Appendix 6.9

MULD Recipe Development

Appendix 6.9

MULD Recipe Development

1) Machine Set Up:

- a) Conveyor guide rails may need to be adjusted to in order to accommodate the package length of a particular product.
- b) Perform adjust force procedure for height of MRE pouch in order to accommodate the height of a particular product.

2) Recipe (Programmable Set Points) Development:

- c) Starting Set Points – Select an unused program and preset with the following set points:

Product Name	MRE
Package Size	8
Product ID	START
Date	1/27/00
Prog #	1
Vacuum Set Pt.	950
Evac. Time Limit	10
Vac. Decay Limit	50
Stab. Time Set Pt.	1
High Resid. Set Pt.	25000
Lower Gross Set Pt.	3000
Force Decay Set Pt.	500
Test Time Set Pt.	3

d) Vacuum Set Point Adjustment:

- i) The stabilized force is affected by the amount of residual gas in the package. Assume that the samples presented for testing are within the acceptable specification for residual gas.
- ii) Manually load a test chamber with 10 samples of the product, run a manual test and record the results on a worksheet (sample worksheet included in this binder).
- iii) If there is a package that has an exceptionally high stabilized force reading have it tested for residual gas.
- iv) If there is a package that has an exceptionally low stabilized force reading check to see if it has a gross leak. If there is no gross leak then have it tested for residual gas.

- v) The target for the stabilized force reading is 3,000 to 20,000 (g). If suitable samples are reading less than 3,000 then increase the VACUUM SET POINT. If suitable samples are reading more than 25,000 then decrease the VACUUM SET POINT.
 - vi) Repeat this process at least 3 times (30 samples) to verify the proper VACUUM SET POINT.
- e) Stabilization Time Adjustment:
- i) When running the vacuum set pt. adjustment tests review the force curves to verify the start of the test period occurs shortly after the force has reached the maximum and has stabilized.
 - ii) If the test period starts too soon then increase the STAB TIME.
 - iii) If the test period could start sooner then decrease the STAB TIME.
- f) Force Decay Adjustment:
- i) The FORCE DECAY is affected by small package leaks. Assume that the samples presented for testing do not have any small leaks.
 - ii) Manually load a test chamber with 10 samples of the product from the last test, run a manual test and record the results on a worksheet (sample worksheet included in this binder).
 - iii) If there is a package that has an exceptionally high FORCE DECAY reading, replace the sample and retest the 10 samples and record the results on a worksheet (sample worksheet included in this binder).
 - iv) Put a controlled hole in 2 sample packages with the lowest stabilized force reading and return them to the same test cell.
 - v) Put a controlled hole in 2 sample packages with the highest stabilized force reading and return them to the same test cell.
 - vi) Run a manual test and record the results on a worksheet (sample worksheet included in this binder).
 - vii) Compare the FORCE DECAY results for the samples tested before the controlled holes and after the controlled holes.
 - viii) Set the FORCE DECAY limit above the maximum FORCE DECAY for good samples (no holes) and below the minimum for the samples for leaking packages (with holes).
 - ix) Replace the packages with holes with additional samples and repeat the above procedure one more time.
- g) Lower Gross Set Pt. Adjustment:
- i) The Evacuation and Stabilized Forces are dramatically reduced by a gross leak. Assume that the samples presented for testing do not have any gross.
 - ii) Manually load a test chamber with 10 samples of the product from the last test (4 samples will have small leaks), run a manual test and record the results on a worksheet (sample worksheet included in this binder).

- iii) Put a controlled gross leak (penknife x pattern) hole in the 4 sample packages with the small holes return them to the same test cells.
- iv) Run a manual test and record the results on a worksheet (sample worksheet included in this binder).
- v) Compare the Evacuation and Stabilized Force results for the samples tested before the controlled gross leak holes and after the controlled gross leak holes.
- vi) Set the LOWER GROSS SET PT. limit above the maximum Evacuation and Stabilized Forces for gross leak samples (gross leak holes) and below the minimum for the samples for good samples (with no holes).
- vii) Replace the packages with gross leak holes with additional samples and repeat the above procedure one more time.

h) High Residual Set Pt. Adjustment:

- i) The stabilized force is affected by the amount of residual gas in the package. Assume that the samples presented for testing are within the acceptable specification for residual gas.
- ii) Manually load a test chamber with 10 samples of the product, run a manual test and record the results on a worksheet (sample worksheet included in this binder). Also record the stabilized force directly on the package.
- iii) Manually load a test chamber with an additional 10 samples of the product, run a manual test and record the results on a worksheet (sample worksheet included in this binder). Also record the stabilized force directly on the package.
- iv) Select the 5 samples with the highest stabilized force readings and have them tested for residual gas. Plot the results on a chart (stabilized force vs. residual gas).
- v) Select the 5 samples with the lowest stabilized force readings have them tested for residual gas. Plot the results on the same chart (stabilized force vs. residual gas).
- vi) From the chart, project and set the HIGH RESIDUAL SET PT. at or near the limit for the maximum residual gas specification.

3) **Optimize Test Cycle Time:**

- i) If the total test time can be reduced then the cycle time of the machine will be reduced which will increase the leak test machine rate and thruput. The total test time is comprised of the evacuation time, stabilization time and the test time. The test cycle time is optimized when the test cycle time is equal to the chamber loading time.
- j) Evacuation time (time required to reach the vacuum set pt. at the beginning of the test cycle) can be reduced if satisfactory tests can be run at lower vacuum levels. If the vacuum set point is changed then all the other test parameters in the above recipe development may be affected.

- k) Stabilization time is a set point that can be adjusted. Reduce the stabilization time to the minimum time that will allow the forces to reach the maximum and stabilize after the vacuum has stabilized.
- l) Test time is a set point that can be adjusted. Reduce the test time to the minimum that will allow reliable detection of the small hole force decay. It is desirable to detect the small hole force decay as quickly as possible before any hole plugging occurs. Any reduction in the test time will also require adjustments to the force decay set point.

Appendix 6.10

Mult-Unit Leak Detector Demonstration, 24 July 1998



**Center for Advanced Food Technology
Rutgers, The State University of New Jersey**

**Combat Rations Network (CORANET)
Short Term Project #1005**

**Multi-Unit Leak Detector Demonstration
9:00AM, July 24, 1998**

**CAFT Food Manufacturing Technology Facility
120 New England Avenue
Piscataway, New Jersey**

Agenda

Introduction	R. Eggers, J. Coburn
Project Summary	N. Litman
Contractor Team: Precision Automation, ITI Qualitek	M. Johnson, D. Morris
Multi-Unit Leak Detector System Overview	J. Tarman, C. Barker
Break	
MULD Demonstration	Team
System Functions	
Controls/Operator Interface	
Automatic Operation	
Bench Unit Demonstration	N. Litman
Discussion	
Implementation	J. Tarman
Next Steps	C. Viola
Lunch	
Private Producer/Contractor Meetings	

Multiple Unit Leak Detector Demonstration

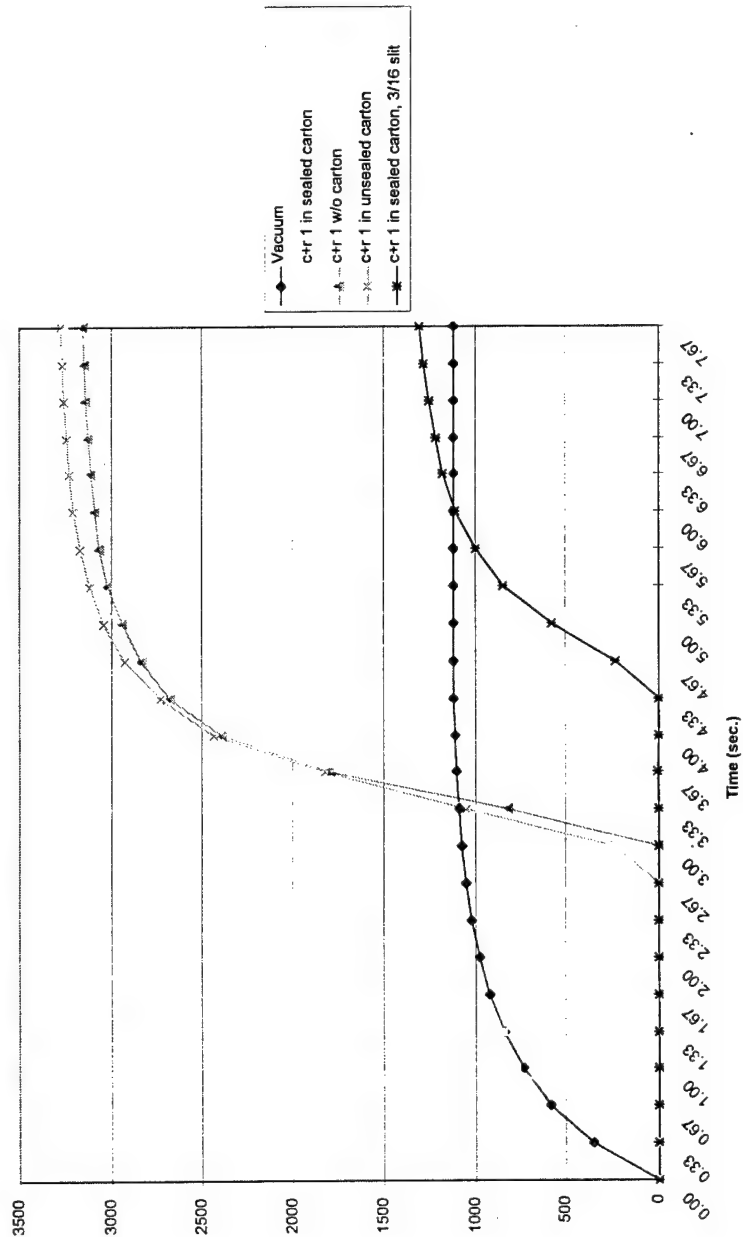
**CORANET - Rutgers University
July 24, 1998
Project Summary**

Preliminary Engineering

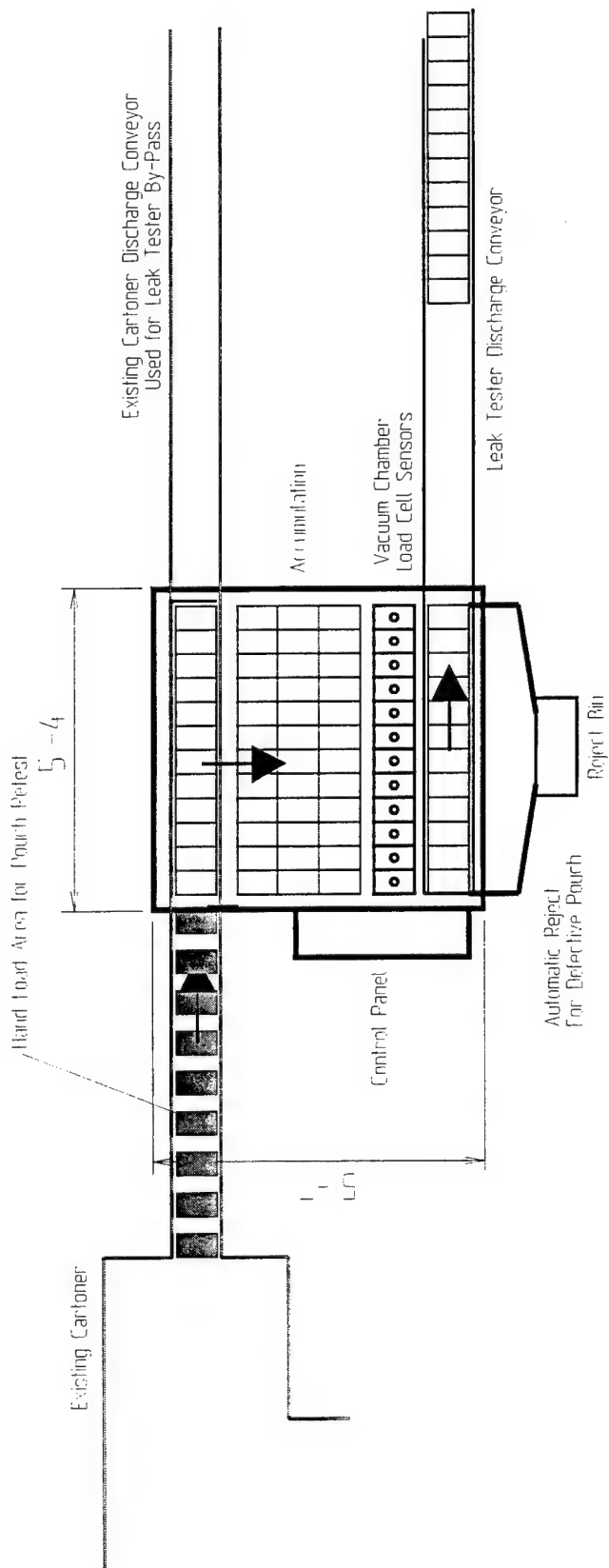
- MRE Producer Input
- Technology Review
- Benchtop Testing
 - In-Carton Test
 - Cycle Rate
 - Temperature
 - Vacuum

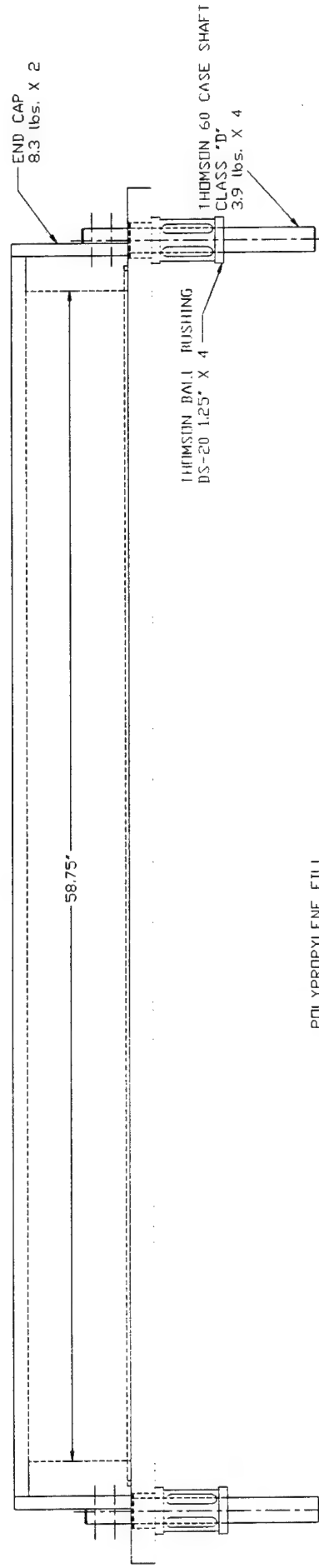
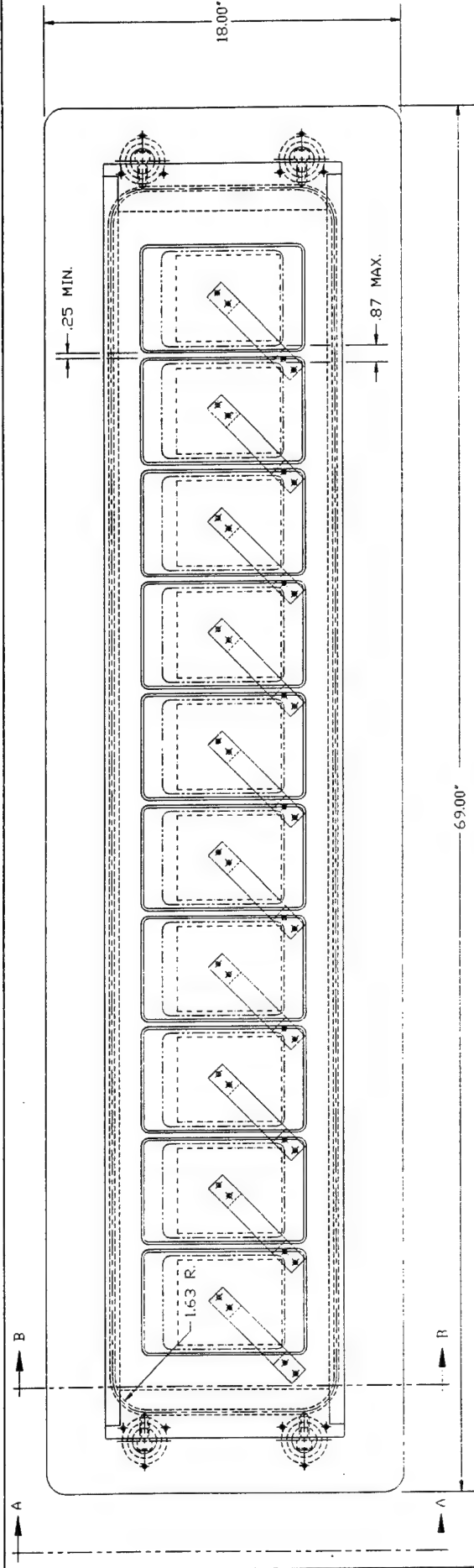
Preliminary Engineering

Chicken & Rice MRE Leak Test Response

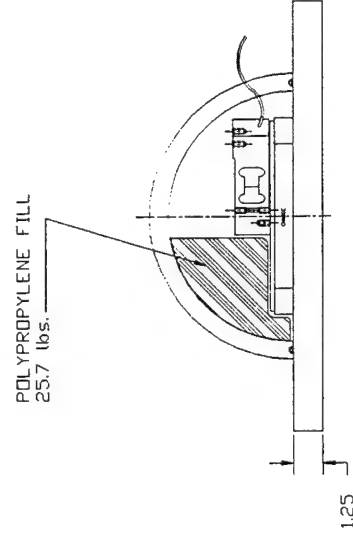


MULD Concept



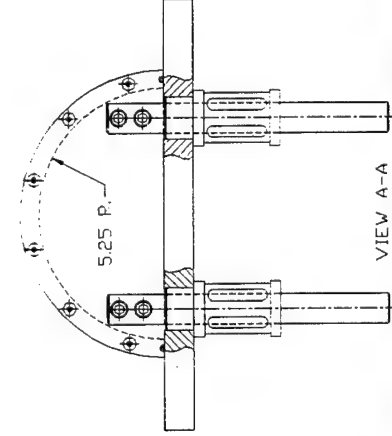


POLYPROPYLENE FILL
25.7 lbs.



6061-T6511 EXTRUDED
ALUMINUM TUBING
12.00 O.D. .75 WALL
78 lbs.

STRAIN GAUGE AG-F
.8 lbs. X 10
FURCE. PLATE
2.1 lbs. X 10



5.25 P.

SECTION B-B

MIC-6 CAST ALUMINUM
100LB & JIG PLATE

Preliminary

PRECISION AUTOMATION COMPANY, INC.	
CHERRY HILL, NJ 08034	
DATE	REV
1/1/80	1
LEAK TESTER - PRE PRODUCTION LINE	
RATED BY	
9-97	
PROTOTYPE	
B-5547-0002.0	

Specifications

- Accuracy 77% for 300-600 micron hole
- Production Rate 100 Pouches/Minute
- Automatic Operation
- MRE Primary, Alternate and 5oz Capable
- Pouch Temperature 70-100F
- Reject Excessive Residual Gas
- Vacuum System

Competitive Bid for MUL

- RFP Sent to 6 Companies
- Proposals Evaluated on Cost, Performance, Features, Delivery, Service and Training
- Proposals From 4 Companies
 - Precision Automation, Rame-Hart/ATC, ITI-Qualitek, PTI/Wilco
- Precision Automation Recommended

In-Process Review

- Phase I Activities Reviewed
- ITI-Qualitek Benchtop Unit Demonstrated
- Recommendation for MULDD
- Approval for Phase II

Project Milestones

- STP 1005 Delivery Order ■ Feb. 19 '97
- Rutgers RFP ■ April 8 '97
- Phase I In-Process Review ■ May 7 '97
- Kick Off at Precision ■ Aug. 25 '87
- MULD Prototype Demo ■ Feb. 6 '98
- Benchtop Demo at R&DA ■ April 7 '98
- In-Plant Demonstration ■ July 24 '98